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OBJECT LESSONS FOR INFANTS

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OBJECT LESSONS

FOR INFANTS

BY

VINCENT T. MURCHÉ

HEADMASTER OF BOUNDARY LANE BOARD SCHOOL, CAMBERWELL; AUTHOR OF 'OBJECT LESSONS IN ELEMENTARY SCIENCE'; AND THE SERIES OF 'SCIENCE READERS' BASED UPON THEM

The Course is intended to be an easy preparation or stepping-stone for the above, and is treated in a manner suitable to the classes in the Infant School

VOL. I

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PREFACE

THIS course of Object Lessons for use in Infant Schools is designed as an easy stepping-stone to the author's more advanced course for use in the Senior departments; and is the natural outcome of the widely-extended favour with which the two preceding series of books have been received in the educational world.

In view of the recent changes in the Code, which have set up new relations between the school, H.M. Inspector, and the Education Department, and affect the everyday life of both teachers and scholars, it has been deemed advisable, after consultation with several Infant Teachers, to arrange the course in four stages. Under the old regime the Infant School seemed to naturally resolve itself into three divisions. It is now thought that, under the new conditions, a course of lessons laid down in four stages will be welcomed by most teachers, as giving them a stage at their discretion, to provide for the more rapid class-promotions which will henceforth take place.

The Departmental Circular on Object Teaching recently issued to H.M. Inspectors comments thus:—"*Object teaching leads the scholar to acquire knowledge by observation and experiment, and no instruction is properly so called unless an Object is presented to the learner so that the addition to his knowledge may be made through the senses. Junior teachers have not unfrequently given lessons before H.M. Inspectors, which were wrongly described as Object Lessons, because in dealing with the topic selected, no suitable appeal was made to the eye of the scholar. However well the lesson may be illustrated by diagrams, pictures, models, or lantern-slides, if the children have no opportunity of handling and watching the actual object which is being dealt with, the teacher will be giving an Information Lesson rather than an Object Lesson.*"

These were the author's guiding principles in designing the former volumes, and they have been steadily kept in view during the preparation of this series for the younger children. From the very earliest lessons, the eye, the hand, and the senses of taste and smell, are all brought into requisition by the children while dealing with the objects before them; and thus, to quote again from the Circular, "*The imparting of* mere *information becomes* altogether *secondary to the cultivation of the faculty of observation.*"

The same official document lays much stress on the value of black-board illustration. "*Teachers,*" it says, "*shall frequently illustrate details of the lesson by black-board draw-*

ings. Children who are jaded in five minutes by a lecture, will be open-eyed and receptive for half an hour while the teacher draws as well as talks." It is with this principle in view that the lessons have been illustrated with just such pictures as will readily lend themselves to reproduction on the black-board.

Another very important point, touched upon in the Circular, has not been lost sight of during the compilation of these lessons. It says: "*The attempt to teach the children to be accurate in observation cannot be separated from the need of making them accurate in description.*"

Hence all the lessons have been written in full, no single step being left unexplained. This of course will also be a great assistance to the young teacher herself.

Lastly, "*There are,*" says the Circular, "*other important uses of good Object Teaching. It makes the lives of the children more happy and interesting by opening up an easily accessible and attractive field for the exercise of brain, hand, and eye. It gives the children an opportunity of learning the simplest natural facts, and directs their attention to external objects, making their education less bookish. It further develops a love of Nature and an interest in living things, and corrects the tendency which exists in many children to destructiveness and thoughtless unkindness to animals, and shows the ignorance and cruelty of such conduct. The value of the services which many animals render to man should be dwelt upon, and the importance* *of kindly treating them and preserving them should be pointed out.*"

In dealing with the animal world, the writer has made these humanising truths a special feature of the lesson, not only in this series, but also in the books for the older children. The children from the first are led to take a kindly interest in the animals around them. Wherever possible, they are encouraged by the teacher to bring some pet animal to school for the lesson, and every lesson tends to strengthen in them the thought that it is their duty to protect these dumb creatures.

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STAGE I

GIVING EARLY IMPRESSIONS—THROUGH THE EYE

(A) LESSONS ON FORM

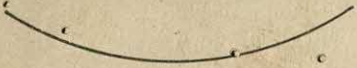
Lesson I

LINES—STRAIGHT, BENT, AND CROOKED

I. STRAIGHT LINES

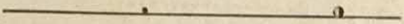
THIS, the first lesson on "form," is intended to teach the shape of simple lines. The children should be provided with slates, pencils, and rulers, and the teacher might proceed in some such way as this:—

Bring two of the children to the front, and instruct them to stretch between them the two ends of a piece of string, while the rest look on. That done, before attempting to elicit anything from the class, have the string held so that it hangs loosely, and then commence as follows:—



"Now, children, I want you all to think about this string. Fred and Willie changed the shape of the string as they held it.

"Pull it tight once more. Now I will take my ruler,



and draw a line on the board, just like this tight string.

"What can you tell me about this line?" "It is **straight.**"

"Quite right. Then what can you tell me about the ruler?" "**The ruler is straight too.**"

"Now what sort of line does the string make when it is stretched out?" "It makes a **straight line.**"

"Quite right, again. Now try and tell me all the things you can see that have straight lines."

In this way lead the children to name their pencils and rulers, the lines of the flooring, the edges of their slates and desks, the window-frames and doors, etc.

"Now I want you to take your slates, pencils, and rulers, and draw some straight lines for me."

The child's natural love of imitation is always turned to good account by the successful teacher; and even at this early stage the little ones will take a delight in **doing** *what they see their teacher do. It is needless to say that perfection is not the thing to be sought for in these exercises. Their purpose is to afford an outlet for the child's restless activity, by giving him from time to time something to do, and so to stimulate and maintain attention without effort through the lesson.*

II. Bent Lines

When sufficient time has been given to this, have the pencils put down; let the two children hold the string loosely in front of the class as before, and proceed as follows:—

"Let us have another look at the string. Does it make a straight line now?" "No; it is not straight now."

"Quite right; it is not straight. See, here is one of your rulers. We know the ruler is straight, because we draw straight lines with it."

Teacher bends it. "Look at the ruler now. Is it straight?" "No; it is not straight now."

"What have I done to it?" "You have **bent** it."

"Yes; the ruler is **bent.** It looks like the string, as we saw it just now."

Draw a curved line on the board with the chalk, and call the attention of the children to it.

"Here, you see, is a line, not straight like your pencil, but just like **the bent ruler, and the string when it hangs loosely.** What kind of line shall we call it?" "Call it a **bent line.**"

"Yes; we may call it a **bent line** now. By and by we will learn a better name.

"Now try and think of some things that have **bent lines** like this."

Lead the children to name cups, plates, saucers, half-pennies, and pennies, and any common things with curved edges; and lastly let them try, as before, to copy one or two such lines on their own slates.

III. Crooked Lines

"Now look at this piece of wire. Is it straight like your pencils?" "No; it is not straight."

"Is it bent, like the edge of the saucer?" "No."

"You are right. It is not bent in the same way as the string and the ruler were bent. We say that the wire is **crooked.**

"See, I will draw a **crooked line** on the board. It is very easy to draw a crooked line."

The teacher should now lead the children, as before, to name things that have crooked edges, after which she may keep up the interest of the class by drawing lines on the board, and calling upon the children to name them, and copy them on their slates; and, if time permit, she may have similar lines drawn at her dictation.

Lesson II

MORE ABOUT LINES

The purpose of this lesson is to teach the position of lines, in a very simple way, without troubling the children at this early stage with such distinctions as perpendicular, vertical, horizontal, and oblique—terms which will come naturally later on.

I. Standing-up Lines

Commence by standing one of the boys in front of the class.

"Now, children, look at Harry Smith. What is he doing?" "He is **standing up.**"

"Look at my ruler. What is that doing?" "The ruler is **standing up** too."

"I will draw a line on the board. What can you tell me about this line?" "**The line is standing up.**"

"Yes; we may call it a **standing-up line.**

"I drew the line with my ruler. What kind of line is it?" "It is a **straight line.**"

"Quite right. We may call it a **straight standing-up line.**

"Suppose you look round the room, and point out to me all the things that have **straight standing-up lines.**"

In this way the children may be led to name the upright edges of the walls, door-ways, window-frames, cupboards, maps and pictures, the table-legs, teacher's desk, etc.

"Now take your slates, pencils, and rulers, and draw some straight standing-up lines for me."

II. Lying-down Lines

"We will leave the standing-up lines. I want you now to tell me what you do when you go to bed. Do you stand up then?" "No, we lie down in bed."

"Yes, you do. Now look at my ruler while I place it on the table.

"What is the ruler doing?" "The ruler is **lying down.**"

"Watch, while I draw a straight line on the board.

What can you tell me about this line?" "It is **lying down.**"

"So it is. We may call it a **lying-down line.**

"See, if I stretch the piece of string between my hands, I make a straight line. What kind of line is it?" "It is a **straight lying-down line.**"

"Take your rulers and hold them in front of you, first standing up, then lying down.

"Very good. Now you may name all the things in the room that have **lying-down lines.**"

The children will readily point out the seams in the flooring, and the horizontal edges of table, desks, doors, walls, and window-frames; the tops and bottoms of maps and pictures, and so on; after which they may be set to work, as before, to draw similar lines on their own slates.

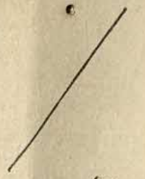
III. LEANING LINES

Place the ruler in a slanting position against the wall, and call attention to it.

"Is the ruler standing up as Harry Smith stood?" "No, it is not standing up."

"Is it lying down?" "No, it is not lying down."

"You are quite right. It is not standing up, and it is not lying down. It is **leaning** against the wall."



Teacher draws a straight line on the board to represent the ruler.

"Look at this line. It is not a standing-up line, and it is not a lying-down line. What may we say about it? It is a **leaning line**; or we may call it a **slanting line.**"

The children should next be led to point out similar lines, as before, and then, as a further exercise, to draw standing-up, lying-down, and slanting lines on their slates, to the teacher's order.

Lesson III

THE SQUARE AND OBLONG

I. THE SQUARE

TEACHER commences by drawing an upright line on the board.

"Who can tell me what we call this line? Well, Mary?" **"A straight standing-up line."**

"Quite right; and what shall we call this one?" **"A straight lying-down line."**

"Now look at the two lines. They join together, and make **a corner.** Look round the room and see if you can find any corners like this one.

"Suppose, now, I draw a standing-up line at the other end of the lying-down line. How many corners have I made now?" "Two corners."

Without telling what she is doing, the teacher will make all the lines the same length, and then proceed to join the ends of the upright ones.

"What kind of line is this one which I have just drawn?" **"A lying-down line."**

"How many corners have I made, now?" **"Four corners."**

"How many lines are there?" "Four lines."

"What kind of lines are they?" "Two **standing-up lines,** and two **lying-down lines.**"

"Now look again at the four corners. What can you tell me about them?" "They are all **alike.**"

"Quite right. They *are* all alike. We call them **square corners,** because they are all alike."

Have a square sheet of drawing-paper prepared beforehand *of exactly the same size, and pin it on the board to cover the figure which has been drawn.*

"How many corners has this sheet of paper?" "**Four corners.**"

"What kind of corners are they?" "**Square corners.**"

"How many sides has it?" "**Four sides.**"

"What kind of sides are they?" "Two **standing-up** sides, and two **lying-down** sides."

"Now you shall all make some square corners for yourselves."

Teacher instructs them to take their kindergarten sticks and peas and do as she does. Let them lay their sticks side by side. What do they notice? The sticks are all the same length.

The teacher proceeds to fix a pea at each end of one of the sticks; the children do the same with theirs.

"This shall be our **lying-down** line, like the one we drew on the board.

"Now we will fix a **standing-up** stick at each end of this one. How many corners have we made?" "Two corners."

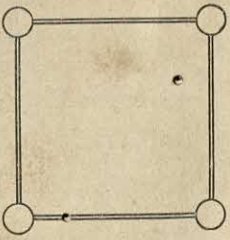
"What kind of corners are they?" "**Square corners.**"

"Let us next fix a pea at each end of another stick, and join the ends to the tops of the standing-up sticks.

"Our **four sticks** have made **four corners**, just like the four corners I drew on the board.

"What do you know about these corners?" "They are all alike; they are **square corners.**"

"What do you know about the sticks?" "They are all **the same length.**"



"Now look again at our sheet of paper on the board. You will see that it has **four square corners,** and **four sides all the same length.** We call it a **square.**"

II. The Oblong

"Take your slates out, and look at them. How many corners has the slate?" "**Four corners.**"

"What kind of corners are they?" "**Square corners.**"

"How many sides has it?" "**Four sides.**"

"Are they all the same length, like the sides of the square?" "No; there are two long sides and two short ones."

Pin upon the board an oblong sheet of paper, side by side with the square. Let the short sides be the same length as the sides of the square. Place it with the short sides horizontal.

"This sheet of paper, you see, is like your slate. It has **four square corners.** It has **two long sides** and **two short sides.** We call it an **oblong.**"

The difference between the two figures may be made very striking if one is fixed over the other.

Let the children name all the things they can see, which are square or oblong in shape; and if time permit let them try and draw these figures on their slates.

Lesson IV

CURVED LINES

I. Curved Lines

Commence by drawing some straight, curved, and crooked lines on the black-board, and proceed as follows:—

"I want you to look at these lines, children. What do we call this one?" "**A straight line.**"

"How did I draw it?" "With the straight ruler."

"Is this a straight line?" "No; it is a **crooked line.**"

"What kind of line do we call this one?" "We call it a **bent line.**"

"Quite right. Harry shall come to the front and show us how to make a bent line with this piece of string. Is that right?" "Yes."

"Now I want you to learn a new name for these bent lines. We call them **curved lines** as well as **bent lines.**

"Suppose you all hold your rulers in front of you as I am holding mine. Now make your **straight rulers** into **curved rulers.** How did you do it?" "We bent the rulers." "That is right."

II. A CIRCLE

"Watch, while I draw a **curved line** on the board. I shall want you to draw one on your slates presently."

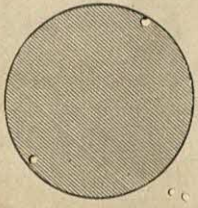
Teacher takes one end of a piece of string in her left hand, and presses it on the board. With the other end stretched in her right hand, she traces a chalk line, continuing the curve till the two ends nearly meet.

"See, I have made a **curved line.** Come to the front, Fred, and show me the two ends of the line. Now point to the two ends of the straight line.

"Suppose we make both of them a little longer." (*Teacher extends both lines.*) "What do you see now?" "The two ends of the curved line have come together, and **joined.**"

"Are the two ends of the straight line joined?" "No."

"Are they closer together than they were?" "No; they are farther apart."



"Quite right. Now let us make another curved line. If we draw it round far enough **the two ends will meet.** See, I will draw another, and another. They all **meet.**

"We call a curved line like this a **circle.**"

Proceed next to mark and cut out with the scissors some paper circles, and have them handed round the class.

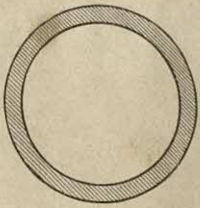
"I daresay you can tell me the names of some things which are the same shape as these **circles.**"

The children will be easily led to mention plates, saucers, pennies, half-pennies, farthings, buttons, and other common things; after which the teacher may set them to try and draw circles on their slates. This little exercise will satisfy the children by giving them something to do; although of course their attempts will be very crude and imperfect.

III. A Ring

Hand round the class some of the kindergarten rings, and call attention to their shape.

"They are round like the **circle**; but are they quite like your paper circles?" "No."



"Can you think of anything that they are like?" "They are like our hoops."

"Yes; they are. We call them **rings.**

"I think you could now tell me how to make our **paper circles** into **rings.**"

Lead the children to tell how this may be done by cutting out the middle of the circle. Do it; and show them that the **paper circles** *have been made into* **paper rings.**

Lesson V

BALL-SHAPE

Introduce the new lesson by leading the children to tell all they can about the circle. A penny, a biscuit, or any other circular object available (the larger the better) may be used for illustration.

"Now, children, look at this biscuit. What shape is it?" "It is **round.**"

"Quite right. It is **round.** What other things can you think of that have a round shape, like this biscuit?" "Pennies, half-pennies, plates, and saucers are round too."

"What other name do you know for a thing that has a round shape?" "**Circle.**"

"Right. The penny and the biscuit are circles. They have a round shape. I will draw a circle on the board. How many lines are there in my circle?" "**One line.**"

"What kind of line is it?" "It is a **curved line.**"

"Let us look once more at the biscuit and the penny."

Take a piece of thin straight wire, and bend it round to fit the circular edge. Then hold the wire up, and lead the children to tell that it now makes **a curved line.** *Show them that this bent wire fits close round any part of the edge. Take next a straight piece of wire, and show that this would not fit round the object.*

"But I can lay the straight wire across the penny or the biscuit, just as I could lay it on this slate, or on the table. They are **flat**, and not round.

"Look at this penny once more, and tell me how many flat sides it has?" "It has **two flat sides.**"

"How many round sides has it?" "**One.**"

Now show a wooden ball (the larger the better). Take as before a piece of thin straight wire, and bend it round the ball. Lead the class to tell that the wire is no longer straight; it is **bent** *or* **curved.** *Show them that this curved wire fits close round the ball wherever we put it. A straight wire would not fit it anywhere.*

"What is the shape of the ball?" "It is **round.**"

"But the penny and the biscuit are round too. Is the ball round like them?" "No; the penny has two flat sides. The ball has **no flat sides.** It is **round all over.**"

Lead the class to mention all the things they can think of, which are round like the ball, the teacher adding to the list as they proceed.

"We may say that all these things, that are round like the ball, are of **ball-shape.**"

The distinction between the roundness of the ball and the *roundness of the penny may be very graphically shown as follows:—Take a turnip, as round in shape as it is possible to get. Let the children tell its shape. It is of* **ball-shape.**

Cut it in two. Let them describe the shape of each half. It has **a round surface** *and* **a flat surface.**

Now cut a slice off one of them, and lead the children to tell that this slice is just the shape of the penny. It has a round edge and two flat sides. It is not like the round ball. It is **circle-shape**—but **not ball-shape.**

(B) LESSONS ON COLOUR

Lesson VI

BLACK AND WHITE BALLS

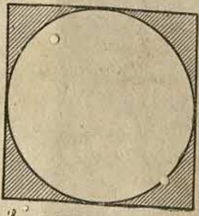
Commence by showing the wooden ball of last lesson, and lead the children to tell all they can of its shape.

Ball-shape means round all over, just like this ball.

Next hand the white balls to the children, and proceed in some such way as follows:—

"I want you to look at these balls. They are round, just like the wooden ball. Suppose I draw a picture of one of them on the board.

"What did I use to draw the picture of the ball?"



"A piece of chalk."

"What is the colour of the chalk?"
"The **colour** is **white.**"

"Why did I use white chalk?"
"To make the picture just like the ball."

"Is the picture like the ball?"
"Yes."

"Then what is the colour of the balls you have in your hands?" "The colour of the balls is **white** too."

"Quite right. You can see the picture of the white ball on the board, because the colour of the board is not white. What is the colour of the board?" "It is **black.** We call it a **black-board.**"

"Now take these other balls in your hands, and I will draw a picture of one of them on the black-board. Is this like one of them?" "No; that is a picture of **a white ball.**"

"Yes, it is. I made it with **white chalk.** I will make another."

Pin a sheet of drawing-paper on the board, and proceed to draw on it another ball with black crayon.

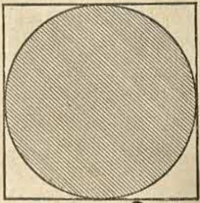
"Is this like the ball you have in your hand, Fred?" "Yes."

"What is the colour of this picture?" "**Black colour.**"

"Then what is the colour of the balls you have in your hands?" "**The balls are black too.**"

"What is the colour of the paper?" "The colour of the **paper** is **white.**"

"Hold up your white ball in your right hand. Now hold up your black ball in your left hand.



"You see, I made a picture of **the white ball** on **the black-board**; and I made a picture of **the black ball** on **the white paper.**

"Let us make a picture of the white ball on the white paper. Will that do?" "No; we cannot see the white ball on the white paper."

"Now let us draw a black ball on the black-board. Can you see that?" "No; we cannot see the black ball on the black-board. We can see the black ball on the white paper, and the white ball on the black-board."

"Now I want you to tell me all the things you can think of, that are white like the chalk and the paper."

In this way lead the children to pick out white articles from their own clothing; from the things in the schoolroom;

and from the common things with which they came into daily contact.

The **snow** *which covers the ground in winter is* **white**; *the* **milk** *and* **sugar** *which they put into their tea are* **white**; *the* **salt** *which they use with their food is* **white**. *Many of the* **animals** *which they see daily are* **white**, *and so on.*

Deal in the same way with things of a black colour, taking care to have as many of the objects as possible on the table for inspection.

N.B.—*It must not be forgotten that, strictly speaking, white and black are not colours at all. White is formed by the blending or combination of all the colours of the spectrum; black is merely the entire absence of colour. This scientific fact, however, may be very well ignored here, just as we also commonly ignore it in our ordinary every-day life, where it is customary to include white and black among the colours. The only purpose of this lesson is to enable the children to recognise white and black as they meet with them. That will be quite sufficient at this early stage.*

Lesson VII

RED AND YELLOW BALLS

I. Red

Hand the red balls round the class, and call attention to their bright, pretty colour.

"Now we will make a picture of one of these pretty balls on this sheet of paper."

Pin a sheet of drawing-paper on the black-board as before, and draw the ball on it with red chalk of exactly the same tint.

"Is this like the ball you have in your hand?" "Yes."

"I will draw another one on the paper. Is this like your pretty ball?" "No; it is **not the same colour.**"

"What colour is this one?" "It is **black.**"

"Quite right. Suppose we have another on the board. Is this like your pretty ball?" "No; this one is **white.**"

"Now, I want you to remember that the colour of your pretty ball is **red**. It is **a red ball**.

"Hold it up in your right hand. Now say, 'This is **a red ball**.'

"Mary shall come here and pick out a black ball. Is that right?" "Yes."

"Now pick out a white ball. Is she right this time?" "Yes."

"Now try and find another red ball. Is she right?" "Yes."

"I want you next to think of all the things you have seen, that are red like this ball."

Let the children mention as many things as they can, the teacher adding to the list when they fail.

"What is this I have in my hand?" "A rosy apple."

"What colour is it?" "It is **red**."

"I will cut it in two. What colour is it inside?" "It is **white inside**."

II. YELLOW

Hand the yellow balls round to the children, and proceed in a similar way. Let them take their red and yellow balls in either hand. Call attention to the new one. Excite their curiosity about it.

"Here is another pretty ball; but it is not like the red ball. It is not the same colour. I will draw a picture of this one on the white paper.

"Is this like your new ball?" "Yes."

"Hold your ball in your right hand and say, 'This is a **yellow ball**.'

"Now I will put some balls on the table.

"Who can find the yellow ball? Well, Fred, you shall try. Is he right?" "Yes."

"Now try and think of all the things you can, that are **yellow like this ball**."

Call several of the children to the front, and let them pick out the various coloured balls as they are named.

"Can you tell me what this is?" "It is an orange." "What colour is it?" "It is **yellow colour.**"

"The apple is for the best boy, and the orange is for the best girl when play-time comes. What must we do with the orange when we want to eat it?" "We must peel it."

"Quite right. I will peel it now. You see it is **yellow outside**; but what colour is it when it is peeled?" "It is **white.**"

A little exercise with the coloured papers may now close the lesson. Hand the strips of coloured paper round the class, and let the children hold them up, one by one, in their hands, as the teacher calls for them; or have a number of them thrown together in a heap on the table, and let the children select the different colours as they are named.

Lesson VIII

BLUE AND GREEN BALLS

I. Blue

Have the blue balls handed round the class. Call the attention of the children to them, and rouse their interest in the new toy.

"This, you see, is a new ball. It is very pretty; but is it quite like any of the other balls I showed you?" "No."

"Come to the table and pick out a red ball, Tommy. That's right. Now put your red ball in one hand, and your new ball in the other. Hold them up and look at them. Are they alike?" "No; they are **not the same colour.**"

"Suppose you pick me out a yellow ball. Quite right. Is your new ball like this one?" "No; it is **not the same colour.**"

"Pick out one that is the same colour as your new ball.

That is right. Hold the two side by side, and you will see that they are alike. They are the same colour.

"Let me draw a picture of your new ball on this sheet of paper. Is this picture like your ball?" "Yes, it is. The **picture** and the **ball** are **the same colour.**"

"Now each of you hold the new ball in your right hand, and say, '**The colour of this ball is blue.**'

"The picture of the ball on the white paper is **blue** too. I made it with this **blue chalk.**"

The children may next be exercised, one by one, in selecting from the balls, paper strips, and other articles lying on the table, any that have the same colour as the blue ball, which they hold in their hand.

Or the teacher herself may select an article from the table, and call upon a child to come to the front and find a ball of that particular colour. Have the two things held side by side, and show that they are exactly alike in colour. We say **the colours match.**

After this the children may be called upon to pick out blue, red, yellow, white, or black objects as the teacher asks for them.

II. GREEN

Hold the blue ball up before the class.

"Now, once more, children, tell me what is the colour of this ball?" "It is a **blue ball.**"

Take a green ball, and hold it side by side with the blue one.

"Here is another ball. Is this like your blue ball?" "No."

"I will draw a picture of this one on the paper by the side of the blue ball. Are these two pictures alike?" "No; the **colour is not the same.**"

"I will pass the basket round, and each of you shall pick out a ball like the one I have just shown you.

"Now hold the ball up in your hand, and look at the picture of it on the paper. It is a **green ball.** Green is another pretty colour; but it is not like red, or yellow, or blue."

The same exercises on "matching" and "selecting" colours should follow as before, after which the children should be led to name familiar objects, whose colour is green, the teacher helping where necessary.

N.B.—*The colour, green, is introduced in this lesson, without any reference to its composition as a secondary colour, but simply to familiarise the children with it by comparing it with those they already know, and especially with blue. They cannot too soon become familiar with this all-pervading colour. It must enter largely into their lessons on plants and common objects which are to follow.*

GIVING EARLY IMPRESSIONS—THROUGH THE HAND

Lesson IX

HARD AND SOFT

Introduce the lesson by calling a child to the front, and placing the wooden ball in one hand, and one of the loose, worsted balls in the other. Instruct him to squeeze both balls, and then lead him to tell the result.

"Can you make the wooden ball smaller by squeezing it?" "No."

"How does it feel?" "It feels **hard.** I cannot squeeze it."

"Can you make the other ball smaller?" "Yes."

"How does this ball feel when you squeeze it?" "It feels **soft.**"

Take away the worsted ball, and give him a boiled potato to hold in place of it. Instruct him to squeeze the wooden ball *and the potato as before, and let the class watch what happens. He cannot squeeze the wooden ball. It is* **hard**. *The potato, in the other hand, squeezes up between his fingers as he presses it.* **The potato is soft.**

"Now I want you to think about your slice of bread and butter. How does that feel when you put it into your mouth and eat it?" "It feels **soft**."

"Just think again. Does it all feel soft?" "The **inside** part is **soft**; the **outside** is **hard**."

"Quite right. What do we call the inside?" "We call it **the crumb**."

"And what do we call the outside?" **The crust.**

"I have some bread here. Fred shall take a piece of the crumb in one hand and a piece of the crust in the other, and squeeze them.

"He can easily squeeze the **crumb**, because it is **soft**; but he cannot squeeze the **crust**, because it is **hard**."

Next let another child take the wooden ball in one hand and a large marble in the other, and squeeze them as before. Lead him to tell that he cannot squeeze either of them. **They are both hard.**

"Wait a moment. We will try them in another way. Look, I can cut the wooden ball with this knife. Could I cut the marble?" "No."

"What does that tell us then?" "The **wooden ball** is **not so hard** as the marble."

"Here is another potato; but this one is not boiled. It is raw. Try and squeeze it, as you did the other one. Can you do it?" "No."

"What does that tell us?" "It tells us that this potato is harder than the boiled one."

"Quite right. Now take the knife and see whether you can cut it as I did the wooden ball.

"You see, you can cut it very easily—more easily than you could cut the wooden ball.

"You can even dig pieces out of the potato with your finger-nail; but you could not do that with the ball.

"So then you see the stone marble is **harder** than the

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wooden ball, and the wooden ball is **harder** than the potato. This potato, too, is **harder** than the one that was boiled."

The children may now be led to the conclusion that by means of this cutting test it is easy to tell hard things from soft.

Let them arrange with the teacher's assistance as many common things as they can, under the two heads **hard and soft.**

Lesson X

ROUGH AND SMOOTH

"Now, children, I want you this morning to think about some of the things I have taught you. You know that one thing is yellow, another black, another red, another blue, another white. Can you tell me how we learn this?" "We can **see** the **colour of things**."

"Quite right; we look at the things, and our eyes tell us what colour they are.

"How do we learn the shape of things?" "Our eyes tell us that too."

"In our last lesson we found out that some things are hard and some soft. How did we find this out? Did our eyes tell us this too?" "No; we took the things in our hands, and **felt them**."

"Yes, we did; and we could find out just as well if we shut our eyes.

"Let us now try and learn something else."

Call one of the children to the front; tie a handkerchief loosely over his eyes, and place in his hands the two pieces of deal board. Tell him, and the class, that he is going to learn something about these things, but his eyes will not help him now, because he cannot see. Instruct him to pass his fingers over the surface of each piece of wood.

"Do they both feel the same?" "No."

"Hold up one of them in front of you. Now rub your hand over it and tell me how it feels." "**It feels rough.**"

"Now hold the other one up, and rub you hand over it in the same way. How does this one feel?" "**It feels smooth.**"

"How did you learn all this?" "I found out **when I touched the things** with my fingers."

"Quite right. You **felt** that one thing was **rough** and the other **smooth.** But you did not want your eyes to learn this."

Remove the handkerchief from the child's eyes, and let him take his place; and then pass round the class the strips of writing paper, and coarse brown paper.

Call upon the children to pick out, without looking at them, first the rough and then the smooth strip.

Let them next, one by one, come to the table, and select from the objects lying there, rough and smooth things as the teacher calls for them.

Pass from these to the things around.

"Here is a book. Take it in your hands.

"What can you tell me about the outside cover?" "**It is rough.**"

"Open it, and feel the leaves inside." "They are **smooth.**"

"Take your slates; rub your fingers along them. What do you find?" "The slates are **smooth.**"

In this way deal with the children's clothing—some of it rough, some smooth; with the brick wall, the smooth painted door, the window panes, the pictures, and so on.

Lesson XI

HEAVY AND LIGHT.

Place on the table in front of the class the cubes of cork, wood, stone, and lead.

Call the attention of the class to them. Lead the children to tell that they are all alike in shape, and that they are not alike in colour.

How did they find this out? Their eyes told them this; but it is all their eyes will tell them.

Bring one of the children to the front, and, as in the last lesson, blindfold him by tying a handkerchief loosely round his eyes. Instruct him to take the cubes in his hand, one by one, beginning with the cork.

"What have you learned, Harry?" "They are **not all alike.**"

"What can you tell me about this one (lead)?" "This one **feels very heavy.**"

"Quite right. Is this one (cork) heavy?" "No; that is **not heavy.**"

"How did Harry learn this?" "He learned it **by taking the things in his hand.**"

"Could he learn it by looking at them?" "No."

Send the child back to his place, and proceed as follows:—

"Suppose I put the four things into this tumbler of water. The lead and the stone, you see, sink to the bottom; the wood and the cork remain near the top of the water."

Call the attention of the children to the sawdust on the table.

"Here is some sawdust. Who can tell me what this sawdust is?

"I will show you."

Take a small saw, and saw a piece of soft wood. Collect up the sawdust, and let the children see what it is, and how it is made. The sawdust is made by sawing wood with a saw. It consists of **tiny bits of wood.**

"Well, now, I have some sawdust like this, and here is some sand. The sand is made up of tiny bits too, but they are **bits of stone.** Let us mix the sand and the sawdust together.

"Now I want you to watch what happens when I pour the sand and sawdust into this tumbler of water."

Do it, and let the class tell what they see.

"Where is the sand now?" "The sand is **at the bottom of the water.**"

"Where is the sawdust?" "The sawdust is **on the top of the water.**"

"Why does the sand sink to the bottom of the water?" "It sinks **because it is heavy.**"

"Why does the sawdust not sink too?" "The **sawdust is not heavy.**"

"Quite right. Because the sawdust swims on the top of the water, we say **sawdust is light.**"

"**Heavy things sink in water. Light things swim on the top.**"

Take next some shot, some sand, some wood and cork sawdust. (One of the denser woods, such as mahogany, would be best for this purpose.) Mix these well up together, and, as before, pour the mixture into a tumbler of water. Stir the whole well up, and leave them to settle. It will be very interesting to show the position of each in the water—the lead-shot at the bottom, the sand forming a layer above the shot, the wood sawdust at the top, and the particles of cork actually riding above all.

"The leaden shot you see is at the bottom of all. Why is this?" "It is **very heavy.**"

"Why does not the sand sink to the bottom?" "It is **not so heavy as the shot.**"

"Why is the cork sawdust at the very top?" "It is **very light.** It is **lighter than the wood sawdust.**"

GIVING EARLY IMPRESSIONS—THROUGH THE SENSE OF TASTE

Lesson XII

SWEET AND SOUR

Commence the lesson by calling the attention of the children to the three tumblers standing on the table.

Lead them to tell that the water in one tumbler looks just like that in the others. Our eyes will tell us nothing.

Excite their curiosity by telling them that although the water in all three tumblers looks the same, it is not really so.

"Tell me how we have learned to find out about some things without looking at them." "We take the things in our hands and **feel them.**"

"Shall we try and learn about the water in the tumblers in this way? See, I will take a handful of water out of this basin."

Lead the children themselves to explain that we cannot take up water in our hands, as we can other things; **it runs away.**

"No; we cannot find out what we want to know by feeling the water. Watch me while I show you how to find out."

Bring a child to the front and instruct him to pour out some of the water from the tumblers into saucers.

Let him take the saucer containing the sweetened water round, and call upon the children to dip the tip of the finger into it and put it to the tongue.

"What have you found out, children?" "The water **tastes sweet like sugar.**"

"Quite right. How did you find that out?" "**We tasted it with our tongue.**"

"Suppose I put some of the water on your hand. Can you taste it now?" "No; we **taste things with the tongue**; we **feel things with our hands.**"

"Can you tell me anything else that tastes sweet like this water?" "Sugar, treacle, honey, and jam taste sweet."

Next have the acidulated water handed round, and deal with it in a similar way.

"Does this water taste sweet too?" "No; it is **not sweet.**"

"You are quite right. We say that this tastes **sour.**

"I made the water **sour** by putting something into it.

"Can you think of anything that tastes sour like this?" "Vinegar."

Pour a drop or two of vinegar into another saucer, and let the children taste it for themselves, as before, by dipping a finger into it.

"Now you shall say after me, '**Vinegar has a sour taste.**'

"Do you know what this is?" "It is **a lemon.**"

"I will cut it in two, and squeeze the juice into this saucer. Now taste the juice, and tell me what it is like."

"It **tastes like the vinegar.**"

"Then what shall we say about the lemon?" "It has **a sour taste.**"

Show some unripe green fruit, of the sort available according to the time of year; e.g. *green gooseberries in the spring, followed by unripe cherries, currants, plums, and apples, as the season advances. The first batch of oranges that reach us in the autumn are always sour, and will serve as illustrations, and so will a green stalk of rhubarb at any part of the year.*

Familiarise the children with the peculiar taste of these things. **They are all sour.**

"Children should never eat sour unripe fruit of any kind. It will make them very ill.

"But let us look now at the other tumbler. We have seen that one has **sweet water** in it, and another **sour water.** Suppose you taste the water in this one."

Let the children taste it, and lead them to tell that it neither tastes sweet like sugar, nor sour like the lemon.

They will no doubt be puzzled to describe the taste.

Tell them that this is clear water, and that **water has no taste of any kind.**

Lesson XIII

SOUR, SALT, AND BITTER

Commence by showing pieces of salt and loaf-sugar, similar in size and shape. Tell the children that one is sugar, the other salt. They are, of course, already familiar with these things.

"I want to find out which is the salt and which is the sugar. Let us look at them.

"What colour is the sugar?" "White."

"What colour is the salt?" "The salt is white too."

"What else can we learn by looking at them?" "We see that they are alike in shape."

"Can we tell which is the salt by looking at them?" "No."

"Could we tell by taking them in our hands, and feeling them?" "No; they both feel rough."

"Now, come to the front, Mary, and put both pieces to the tip of your tongue. Can you tell now, which is the sugar, and which is the salt?" "Yes, **the sugar tastes sweet.** The **salt does not taste like the sugar.**"

"Quite right. You may say that it has **a salt taste.**"

Take now three small saucers. Into one grate a little sugar, into another a similar quantity of salt, and into the third put some tartaric acid.

"Here are three white powders. They all look alike. Let us see what we can find out about them.

"Come here, Fred, and put the tip of your tongue to one of the powders. That is right. Have you found out anything?" "This is sugar. **It tastes sweet.**"

"Very well. Now try this one." "This one is **sour like vinegar** and **lemon-juice.**"

"Now put your tongue to this one. Does this taste like the sugar?" "No."

"Does it taste sour like vinegar?" "No; it has **a salt taste.** It is salt."

Put a small quantity of sulphate of quinine in another saucer, and stand it on the table with the rest. The name of the new substance, of course, need not be given.

"Here we have another white powder in a saucer. I will first change the saucers about, and then Harry shall come and find out the one I want by tasting it as before."

Let him taste each till he comes to the right one. His wry-face will soon tell when he has found it.

"Why did you make such a face, Harry? Don't you like the taste of this?" "No; it is very nasty."

"Then I suppose it is not sweet like sugar?" "No; **it is not sweet.**"

"Is it sour like the lemon-juice?" "No; **it is not a sour taste.**"

"Is it salt?" "No."

"This powder tastes unlike any of the others. We say it has **a bitter taste.**"

Some wormwood, gentian root, rue, or one or two gall-nuts might be easily obtained, as further illustrations of things that are bitter to the taste.

LESSONS ABOUT PLANTS

The following simple lessons on plants are not intended to serve as mere sources of information. Like the preceding lessons, they have a higher purpose—that of leading the children to observe for themselves, and (under the guidance of the teacher) to draw their own conclusions. This will naturally arouse their curiosity, and make them eager to learn more.

In these lessons, as well as in others, it is in the highest degree essential (if the children's observations and deductions are to proceed on common-sense lines) that there should be no lack of suitable specimens for illustration. Indeed, the lessons should never be given without such specimens. Hence it may sometimes be found necessary to change the order of the course, so far as these lessons on plants are concerned, to ensure their being taken at a time when living specimens can be easily obtained.

Lesson XIV

A PLANT

Place the plant on the table, and lead the children to talk about it in some such way as the following:—

"What is this, children?" "It is a pretty flower."

"Where do we see flowers?" "In the garden."

"Can we always find flowers in the garden?" "No; there are no flowers in the cold weather."

"What do we see if we go out into the garden in the cold weather?" "We see snow and ice. The flowers are all gone."

"Quite right. The flowers like the warm, sunny weather. They do not like the cold snow and ice.

"This one, you see, is in a flower-pot. It has been standing in the window. Most people like to keep flowers in the window. Why?" "Because **the flowers are bright and pretty.**"

"Let us see now what we can find out about this one.

"Which part of it do you like best, Mary?" "The **flower.**"

"Come and point to the flower. What colour is it?" "It is **red.**"

"Are all flowers red, like this one?" "No."

"Look round the room and see if you can find a flower of another colour."

Have in readiness two or three common plants, bearing blue, white, and yellow flowers respectively. There is no need to particularise them here. The selection of plants will of course depend entirely upon the season of the year.

Lead the children to compare these flowers with those of the original specimen, and let them tell the colour of each, as it is brought up to the table.

"We will now leave these pretty red, yellow, blue, and white flowers, and see what else we can find out.

"What is this?" "It is **a leaf.**"

Take each plant in succession, and lead the children to tell (a) *that they all have a great many leaves;* (b) *that the leaves are all* **alike in colour**—*they are all* **green**; (c) *that they are not alike* **in shape.** *Pick a leaf or two from each plant, and let the children see* for themselves *how widely one differs from another.*

Turn again to the geranium. Call attention to the part that stands up from the soil in the flower-pot. Explain that this is called the **stem.**

"Now let us go back to the flowers and leaves. They are alike in one thing. Look at the part that joins the leaf to the stem. We call it the leaf-stalk. Now look at the flower, and you see it has **a stalk** too. This is **the flower-stalk.**"

Call attention next to the **position** *of the leaves. Each leaf has an upper and an under side. The leaves spread themselves out to get as much air and light as they can.*

"What must we do for our flowers if we want to keep them?" "We must water them."

"What would happen if we did not give them water?" "They would **die.**"

"Then do you mean to say that this one in the flower-pot is alive?" "Yes; **it is alive**; but it would soon be **dead** if we did not **give it water.**"

"Where do we put the water?" "We pour it **into the soil** in the flower-pot."

"What good does that do? Let me show you."

Turn a plant out of the pot, shake the earth from the roots, and call attention to this part. This is a part which we cannot see, because it is in the soil. We call it **the root.**

Point out the difference in colour—**the roots are white,** *but the leaves are green, and the flowers some other colour.*

Explain that these roots keep the plant alive. They suck up water out of the soil to feed it. Remind them that as the plant is a living thing, it grows bigger and bigger, and it must have food. **The root finds food for it out of the soil,** *if we keep the soil damp.*

Lead the children to think of the flowers in the garden, in the wind and rain. Another purpose of the roots will quickly force itself on their minds. The **roots hold them firmly in the soil.**

Proceed, lastly, to gather up the teachings of the lesson, one by one, and explain that things which live and grow in the ground, and have a root, stem, leaves, and flowers, are called **Plants.** The flowers in the flower-pots are all **plants.**

Lesson XV

A TREE

Commence the new lesson by leading the children to recapitulate briefly the main facts taught in the last. A good sturdy fuchsia, or geranium in a pot, will serve to illustrate the teaching.

Stand the plant on the table before the class, and call upon the children to name and point out its different parts—root, stem, leaves, and flowers.

Begin with the root. It is hidden away in the soil; we cannot see it; **it grows downwards**; *all the rest of the plant grows up towards the light.*

Let the children tell its double purpose—of **feeding the plant,** *and* **holding it firmly** *in the soil.*

"Why does the plant want food?" "It is a living, growing thing, and must be fed. Boys and girls live and grow, too, and they must be fed."

"What name do we give to all things that live and grow in the ground like this one?" "We call them **plants.**"

"What must we do to keep our plants alive?" "We must water them."

"Quite right. Don't forget that the roots cannot take food from the soil, if it is kept dry. If we do not water the soil **the plant will die for want of food.**"

Show a plant that has been allowed to die in this way. The leaves are not green and bright, and firm to the touch, like the leaves of our plant in the pot; they hang and droop, but **the leaves of our live plant stand out well from the stem.**

Next call attention to the stem. It rises up from the ground towards the light and air.

"Now I want you to think. The stem of this plant grows upwards from the soil in the flower-pot; but I have seen some plants that grow up very high indeed—as high as our school. Can you tell me what I mean?" "**Trees.**"

"Yes; trees live and grow in the ground, and stretch up high in the air. **Trees are plants**, just like this one in the flower-pot. They have roots to hold them in the ground, and feed them. We water the roots of our

plants in the flower-pots; but did you ever see any one go round with a watering-can to water the trees?" "No."

"Can you tell me how the roots of the trees get water from the soil?" "The rain falls and waters them."

Show now a good picture of a tree.

"What do we call the part of the plant which grows up from the root?" "We call it **the stem.**"

"Quite right. This is the stem of the tree. **The stem of the tree** is called its **trunk.**"

Notice that the trunk splits up into many parts, and that these parts stretch out from it, like great arms, all round. Some of them are very large. They are **the branches.** *The branches split up into smaller and smaller ones. The very small ones we call* **twigs.**

Show a piece of the stem or branch of a tree. Tell what it is, and ask the children what they think it looks like. It looks like **wood.**

Explain that **it is really wood.** *All the wood we use comes from the hard trunks and branches of trees.*

"Now let us look again at the twigs of the tree in the picture.

"What do you see on the twigs?" "The **leaves.**"

"What holds the leaf to the twig?" "A little **leaf-stalk.**"

"What colour are the leaves?" "The leaves are **green.**"

"When do the trees look best?" "In the summer."

"Why?" "Because they are full of green leaves."

"Did you see the trees when the snow was on the ground?" "Yes."

"How did they look then?" "They looked bare. Their **leaves were all gone.**"

"Yes; most trees lose their leaves in the cold weather. They get new leaves as soon as warm weather comes again."

If the time of year permit, provide a few clusters of apple, pear, or cherry blossom, some sprays of hawthorn, laburnum, or horse chestnut.

"Look at these pretty flowers. They all grew on trees. **Trees,** like other plants, **have flowers.**

"I think you all know this flower. How sweet it smells.

"What do we call it?" "We call it May-blossom."

"Here is another bunch of pretty flowers. They grew on an apple-tree. When the flowers fall off, **little apples are left behind** on the twigs. The apples grow all through the warm weather, till they are big enough and sweet enough to pick and eat."

Lesson XVI

GRASS

Place the grass plants on the table. If possible there should be sufficient for distribution round the class.

Call attention to them, and proceed as follows:—

"Can you tell me what I have here, children?" "It is **grass.**"

"Where do you see grass?" "We see it in the fields."

"Yes, in the fields and on the hills the grass covers the ground. Boys and girls like to run and romp about on the grass.

"We are going to try and find out something about the grass to-day."

Hand some of the specimens round to the children, and let them examine them under the direction of the teacher.

"Look at your grass, and tell me what colour it is." "It is **green.**"

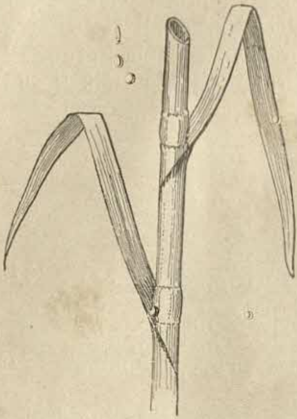
"Quite right. It is the bright green colour of the grass that makes the fields look so beautiful. Think how bare and ugly it would be, if there were no grass on the ground.

"Now I want you to look carefully at each little piece of grass. Pick one off just as I am doing. We call this **a blade of grass.** Each little blade is like a **long, green, pointed ribbon.**

"Can you tell me what it really is?" "It is **a leaf.**"

"Yes, it is a leaf; for **grass is a plant,** and grows just as all plants grow. But the leaves of grass are not like any of the leaves we saw in our other lessons."

The plants which were examined in the former lessons should *be brought forward again, in order that their leaves may be compared with the blades of grass.*



Point out that the leaves of the grass grow out from a stem. Cut the stem through to show that it is **hollow.** *Show also that there is a* **knot** *or* **joint** *in the stem at the place* **where each leaf grows.**

Call attention next to the earth which is clinging to the roots. Lead the children to explain how it came there. Make them tell that this part of the plant is the **root**; *that it grows downwards* **into the soil**; *that there is no earth on the green leaves, because they grow upwards towards the light and air.*

Shake the soil away from the root, and then proceed to examine this part of the plant. Let the children themselves tell that the roots are like **rough, yellowish-white strings,** that stretch down into the soil.

Explain that **roots are never green** *like the other parts of the plants.*

"What do the roots do for the plant?" "They **feed the plant** with food from the soil. They **hold it firmly** in the ground."

Show now a specimen in flower. Lead the children to compare these with other flowers they have seen.

"What is the colour of the grass flowers?" "Their colour is **green.**"

"The flowers of some kinds of grass are very beautiful if we look closely into them."

Lead the children to tell that they often see sheep and lambs, and horses and cows in the fields. They feed on the fresh green grass.

Lesson XVII

BUTTERCUPS AND DAISIES

Introduce the new lesson by leading the children to talk about the grass—what it is, and where it grows.

Then show the specimens of gathered flowers, and proceed as follows:—

"I have here some bunches of pretty flowers, which grow in the fields with the grass. Children love to gather these pretty flowers. Can you tell me the name of this one?" "It is **a buttercup.**"

"What do we call this one?" "We call this one **a daisy.**"

"Quite right. Let us have a chat now about these pretty buttercups and daisies that children love so much. Suppose we talk about the buttercup first."

I. The Buttercup

Separate the bunch, and distribute the flowers among the children.

"Now I want you all to look at your flowers, and we will see what we can find out about them.

"What colour are they?" "They are **yellow.**"

"What name do we give them?" "**Buttercups.**"

"Can you tell me why we call them buttercups?" "Because they are **yellow like butter.**"

"Yes; that tells us about the colour. But look again at your flower, and you will see that it is really **a pretty little cup.** So we call it a **butter-cup.**

"I want you to look carefully, and you will see that the inside of the cup is beautifully **smooth** and shiny, and of a **bright yellow colour.** Now turn your flower over and look at the outside of the cup."

Lead them to tell that the outside is **not so smooth,** *that it does not shine, and that the colour is* **not the same bright yellow** *as it is inside.*

"Now we will have one more look at the flower-cup. Spread the cup open, and you will see that it is not all in one piece. How many pieces are there in your flower-cup, Mary?" "There are **five pieces.**"

"Quite right; and I see there are five in mine. Watch while I pull off all the five pieces of this one."

Lay them carefully on a slate or a sheet of paper. Call attention to their rounded form, and the point where they are joined to the rest of the flower. Lead the children to tell that they are really soft, smooth, yellow leaves. We call them **the flower-leaves.**

Instruct the children next to strip off their yellow flower-leaves.

Show the five **little green leaves outside them.** *These are* **rougher** *and stronger than the pretty yellow flower-leaves.*

Produce the growing plant now. There will probably be an unopened flower-bud on it. Point this out, and lead the children to tell that the hardy green leaves are meant to cover up the tender yellow flower-leaves, and take care of them till they are fit to open.

Call attention next to the green stalk which supports the flower and holds it up to the light and air. Trace it downwards, and show where it springs from the base of the plant, and then proceed to deal with the leaves. Let the children examine the shape of the leaf, the difference between its upper and under surfaces, and the way in which it is joined by its stalk to the base of the plant.

Turn one of the plants out of the pot, and shake the soil from the roots. Let the children see these roots for themselves, and help them to describe their appearance and tell of their uses.

"Our pretty **buttercup is a plant.** It **grows in the ground; it has roots** stretching down into the soil; and it bears **leaves** and **flowers.**"

II. The Daisy

"Let us now look at the daisy and see what we can learn about that."

Distribute, as before, the specimens round the class, and proceed to deal with them as we have done with the buttercup.

First lead the children to describe the colour. The daisy is not one colour like the buttercup. There is a **bright yellow spot** *in the middle, which we call the heart of the flower, and outside this is a* **ring of white.**

Call special attention to this white ring. Strip the florets one by one from the margin, and let the children see for themselves that, instead of five rounded flower-leaves, the daisy has a very large number.

Notice that they are long and pointed, and that the tips are tinted with red. Point out, too, the little cup of green leaves outside the rest of the flower.

Show next the short stiff stem which supports the flower. The daisy always holds its head up towards the sky. Explain that, as night comes on, it seems to go to sleep, for it shuts up its pretty flower-leaves, and looks then only like a little round ball; but as soon as the sun begins to shine the next morning it opens again. This is why we call it **the daisy.** *It means really the* "**day's eye.**"

Proceed next with the leaves. Hand a few leaves round to the children, and lead them to describe what they see. The leaves are **not like those of the buttercup.** *They are thicker; their under side is covered with fine hairs; their edges are notched and not smooth.*

Lastly, one of the plants may be turned out of the pot, and the roots examined as before.

The daisy, like the buttercup and the grass, **is a plant.** It **grows** in the ground; it has a **root, leaves,** and **flowers.**

LESSONS ON COMMON OBJECTS

Lesson XVIII

A BOX

Show the children an empty chalk box. Let them tell what it is, and what it has been used for in school.

"We are now going to see what we can learn about this box. First of all you shall tell me what the box is made of." "It is made of **wood.**"

"Where did the wood come from?" "It was got from the trunk of some tree. **All wood comes from the trunks of trees.**"

"Take the box in your hand, Fred, rub your finger over it, and tell me what you learn." "The wood **feels rough.**"

"Here is a sheet of blotting-paper. Rub your finger along that. How does that feel?" "It **feels rough, too,** but not so rough as the wood."

"Now rub your finger along this sheet of writing-paper and tell me how it feels." "It feels very **smooth.**"

Produce the unbroken box, filled with chalks. Instruct the child to take this one and the empty box in either hand.

"Now tell me what else you have found out, Fred." "This box is **heavy**; the other is **light.**"

Set the child to cut the box with a knife. He cuts it with difficulty. Show one of the pencil boxes. Let him try to cut that. It cuts easily. Lead him to tell that the one is made of **hard wood,** *the other of* **soft wood.**

If a piece of one of the denser woods, such as teak, be now given him, he will find that it is still more difficult to cut than the wood of the chalk box. This wood is **harder** *still.*

"Now let us look at the shape of the box."

Let the child take the unbroken box in his hand again and point out the different sides. The box has six sides altogether.

"What shall we call this one which rests on the table?" "That is the **bottom** of the box."

"What shall we call this part?" "The **top** of the box."

"Quite right; and besides the top and bottom there are **two sides** and **two ends**." *Let the children point them out.*

Prize off the top of the full box carefully, with an old chisel or a screw-driver, so as not to break it, and proceed to examine it as follows:—

"Look at this piece of the box. How many sides has it?" "It has **four sides.**"

"Are the sides all the same length?" "No, there are **two long sides** and **two short sides.**"

"How many corners are there?" "**Four corners.**"

"Can you tell me what kind of corners they are?" "**Square corners.**"

"I think you can tell me what we call a figure which has two long sides and two short sides, and four square corners." "We call it **an oblong.**"

"Then what is the shape of this part of the box?" "It is **oblong shape.**"

Now place this on the bottom and sides of the box, and lead the children to see that they are all the same shape and size.

"How many oblong sides has the box then?" "**Four oblong sides.**"

"Now let us look at the ends."

Have one of the ends measured by means of the short side of the oblong top. Let the children see that the **sides are all equal.**

"What have we learned now about this part of the box?" "The four sides are all the same length."

"How many corners are there?" "**Four corners.**"

"What kind of corners are they?" "**Square corners.**"

"What name do we give to a figure with four sides all the same length and four square corners?" "We call it **a square**."

"Then this end of the box is **a square.**

"Look at the other end. What can you tell me about that?" "It is a square too."

"Yes; our box has six sides—**four oblong shape,** and **two square.**"

It would be very interesting now to show the parts of the other box, which was taken to pieces, let the children examine them for themselves to prove what has just been said, and then fit them together with a few tacks to make a complete box like the one which has served to illustrate the lesson.

Lesson XIX

A ROSY APPLE

Show one or two good specimens.

"You all know what these are, children?" "They are apples."

"All boys and girls like apples. Look at this one. Isn't it a beauty? I want you to help me find out all we can about it. First of all, what colour is it?" "It is **red.**"

"Yes, it is red. Look at Tommy Brown's cheeks. What can you tell me about them?" "His **cheeks are red.**"

"So they are. We say Tommy has rosy cheeks, because they are red. We might call this pretty red apple, **a rosy apple.**"

"Are all apples red, like this one?" "No; some are **yellow** and some are **green.**"

Call upon one or two of the children to come to the front and select red, green, and yellow apples from those lying on the table.

"Take this rosy apple in your hand, Norah, and look at it. Is it red all over?" "No; this part is not red."

"What colour is it then?" "This side of the apple is **green**."

Have a green, a red, and a yellow apple cut in two.

"What colour are the apples inside?" "**White.**"

"So then we find that the apples are all white inside, but the outside is either green, or red, or yellow."

"Now, before you sit down, Norah, pass your finger over the apple and see what else you can find out about it." "It feels **smooth.**"

Peel off the outside skin with a knife, and show that it is only this part of the apple which is smooth.

"Now, I want you to have another look at the apple. Can you tell me what shape it is?" "It is round like a ball."

"What shape may we call it then?" "**Ball-shape.**"

"Can you tell me where apples come from?" "They **grow on trees.**"

"Where would you look on the trees to find the apples growing?" "On the **branches.**"

"What do we call the very little branches?" "**Twigs.**"

Call attention to the stalk of the apple.

"What is this?" "It is **the stalk** of the apple."

"What use is it?" "It holds the apple to the twig where it grows."

Lead the children to tell that leaves and flowers grow on the branches as well as the fruit, and that they all have stalks like the stalk of the apple.

Show a good picture of an apple-tree full of ripe fruit.

"Mary shall come to the front, and point out the **branches** and **twigs** of the tree in this picture. Now show me the **leaves,** Mary. Now the **apples.**

"Quite right. But we have not found the flowers yet. Where are the flowers?" "The flowers are gone. The fruit does not grow **till the flowers die.**

"Now Fred shall come and take this apple in one hand and this wooden ball in the other, and squeeze them. What have you found out, Fred?" "The **ball** is **hard,** the **apple** is **soft.**"

"How did you find that out?" "The ball **felt** hard when I squeezed it; the apple **felt** soft."

"How could you find this out in another way?" "By **cutting** them with a knife."

"Take the knife then and try. Which cuts best, the apple or the wooden ball?" "The apple."

"What does that tell you?" "The apple is **not so hard** as the ball."

Have in readiness an unripe apple (a crab would be best) and a very ripe one. Cut both in pieces, and put them in separate saucers.

Hand pieces of the ripe one round to the children to taste. Let them tell that this apple tastes sweet; and then deal with the other in the same way.

"Why are you all making such wry faces? Don't you like this apple?" "No; it is **sour**."

Repeat the advice that was given in an earlier lesson as to unripe fruit. It is always sour like this apple. It would make us ill if we ate it.

Lesson XX

A TABLE

I. INTRODUCTION

Call attention to the schoolroom table. Lead the children to tell all they can about it and its uses, in some such way as this—

"You all know what this is. What do we call it?"

"A table."

"You have seen me use the table. Tell me what we use it for." "We stand things on the table."

"Suppose we had no tables; where should I have to put the things?" "On the floor."

Take a few books or slates, and put them on the floor. Lead the children to see how awkward this would be. Every time we put a thing down, every time we took it up, we should have to stoop.

"Why don't we have to stoop when we lay a thing on the table?" "Because **the table is higher** than the floor."

Lead the children to talk of their tables at home, and the uses to which they are put. The things which they want for breakfast, dinner, and tea are set out on the table; mother makes the puddings, folds and irons the clothes, and does many other things on the kitchen table.

"Suppose we see what we can find out about the table."

II. THE TOP OF THE TABLE

"What do we call this part of the table?" "The **top** of the table."

"Let us look at this part first. How many sides has it?" "**Four sides.**"

"Come and show me the four sides, Harry.

"Are these four sides all the same length?"

Take a piece of string and show the children how to measure the sides. Lead them to tell that there are **two long sides** *and* **two short ones.**

"What do we call this part where two sides meet?" "**A corner.**"

"How many corners are there?" "**Four corners.**"

"Now look at them, and tell me what kind of corners they are." "They are **square corners.**"

"So, then, the top of the table has two long sides and two short ones, and all its corners are square corners. What shape is it?" "**Oblong shape.**"

Call upon the children to name some things which have the same oblong shape, such as their books and slates, the doors and windows, the pictures on the wall, and so on.

Draw an oblong figure on the board to represent the table-top, calling upon the children to name each step of the process.

"Are all tables the same shape as this one?" "No; some tables are round."

"What do you mean by round? This ball is round. Are some tables round like the ball?" "No, not round like the ball, but the same shape as a penny."

"What shape is that?" "**Circle shape.**"

III. THE LEGS

"Now I think you told me that the table is higher than the floor. What makes it higher than the floor?" "**Its legs hold it up** above the floor."

"How many legs has the table?" "**Four legs.**"

"Where are the four legs placed?" "**Under the four corners.**"

"Have all tables four legs?" "No; some tables have only one leg."

"If there is only one leg, where is it placed?" "**Under the middle** of the table."

"Come and show me the middle of this table, Fred.

"How have we learned all these things about the table?" "We have found it out **by looking at the table.**"

"Now I want one of you to come and find out something more by feeling the table.

"Well, what have you found out?" "It is **hard.**"

"Is the table as hard as this slate?" "No, it is **not so hard** as the slate."

"How do you know that?" "We could **cut it with a knife**; we could not cut the slate."

"Can you tell me what the table is made of?" "It is made of **wood.**"

"Where do we get the wood to make our tables?" "We get wood from the **trunks of trees.**"

"Now put your hand once more on the table and see what else you can tell me." "The table is **smooth.**"

If time and opportunity permit, a further lesson might be given on the table-drawer—its shape, its uses, the way in which it is drawn in and out, and so on.

Lesson XXI

A CHAIR

I. INTRODUCTION

LEAD the children to think about the lesson on the table. Let them enumerate some of the uses which we mentioned in the last lesson.

"We eat our meals at the table. When dinner is ready we take our places. If we stood round the table we should find it very high for little boys and girls, and very low for father and mother. What do we all do?" "We **sit** round the table."

"What do we sit upon?" "We **sit upon chairs.**"

"Here is a chair. Suppose we have a chat about it now."

II. THE SEAT OF THE CHAIR

"You say we sit upon the chair. Come and show me the part of the chair which we sit upon, Harry.

"Quite right. What is this part of the chair called?" "The **seat.**"

Hold the chair up in front of the children, so that they can get a good view of the seat.

"Look at the seat of this chair and see what you can tell me about its shape.

"How many sides has it?" "**Four sides.**"

"Are all four sides the same shape?" "No; one side is **straight**, the other three are **curved.**"

III. THE LEGS

Compare the seat of the chair with the top of the table. Both are raised up from the ground; but the table is **higher** *than the chair.*

"What do we call the parts that raise the top of the table from the floor?" "The **legs.**"

"What, then, shall we call these parts that raise the seat of the chair above the floor?" "The **legs.**"

"How many legs has the table?" "Four legs."

"How many legs has the chair?" "**Four legs.**"

"Where are the legs of the table placed?" "At the four corners."

"Where are the legs of the chair placed?" "**At the four corners.**"

"Look at the legs of the table, and then at the legs of the chair, and see if there is anything else you can tell me about them." "The legs of the chair are not so long as the legs of the table."

Call attention to the cross-bars stretched between the legs. There are no such bars between the legs of the table. Explain that these bars are meant to keep the legs **firmly in their places.** *They are not meant to put the feet on.*

How many of these cross-bars has this chair? Have them pointed out. We call them **rails.**

IV. THE BACK

"There is one part of the chair which we have not spoken of yet. Come and point it out, Fred. What do we call this part of the chair?" "**The back.**"

"What is the use of the back?" "We **lean against the back** when we sit down in a chair."

Place a stool in front of the class. Show that this has a seat and four legs, like the chair. We sit upon it as we sit upon a chair; but if we are tired there is nothing to lean against—there is no back. A chair is much more easy to sit upon, and rests us better than a stool, because it has a back.

"Now look again at the back of the chair and tell me how many pieces there are in it." "Four pieces."

"Come and point to the upright pieces, Mary. How many are there?" "**Two upright pieces.**"

"What would you call the other pieces?" "**Lying-down pieces.**"

"How many lying-down pieces are there?" "**Two lying-down pieces.**"

"What is the shape of the top piece?" "**Curve shape.**"

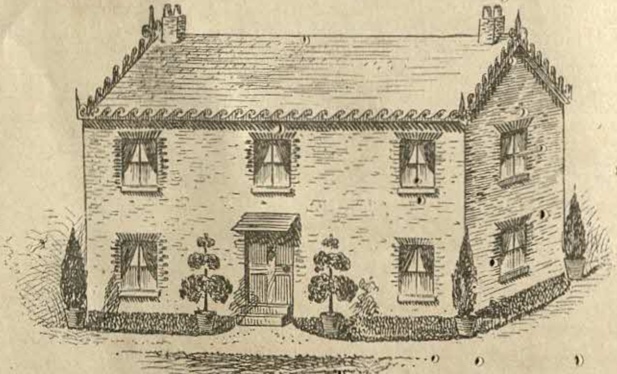
Lead the children next to tell that all chairs are not like the one before them. Some have soft, padded seats, covered with leather, horse-hair, cloth, etc. Some have bars at the sides to rest our arms upon. We call these **arm-chairs.** *Baby sits up at the table in a* **high chair,** *which has arms to keep it from falling out. Little children sometimes have a tiny* **low chair,** *just big enough for themselves, where they can sit without any fear of falling.*

Lesson XXII

MY DOLL'S HOUSE

I. INTRODUCTION

Introduce the lesson by asking the children to tell where they go when school is over. They go home. They live at home with father and mother, brothers, and sisters. What do they call the place where they live? A house. Here is a pretty doll's house. Isn't it a beauty, children? Now I want you to tell me all you can about the house where you live, by looking at dolly's house.



II. OUTSIDE THE HOUSE

1. **The Walls.**—"Why do we live in houses?" "To keep us from the **wind** and **rain** and **cold weather.**"

"Which part of the house is it that keeps out the cold and the wet?" "**The walls.**"

"What are the walls made of?" "They are made of **bricks.**"

"Look at dolly's house. Come and point out the walls, Mary.

"How many walls are there?" "**Four walls.**"

"How many walls are there in your house?" "**Four walls.**"

"Look at dolly's house again and tell me how the walls are placed." "They are **upright.**"

"What do we call this part where the two walls join?" "**A corner.**"

"What kind of corner is it?" "**A square corner.**"

"How many square corners are there?" "**Four square corners.**"

2. **The Roof.**—"What do you call the top of your house?" "**The roof.**"

"What does the roof rest upon?" "It rests upon the walls of the house."

"What is the roof made of?" "It is made of **tiles** (or **slates**)."

"Look at the roof of dolly's house. What is the shape of it?" "It is **slanting.**"

"Why is the roof of the house made slanting?" "To let the **rain run off** quickly."

"Why do we want the rain to run off?" "To keep the house **dry.**"

"Where does the rain go when it runs off the roof?" "It runs down the spouts into the drains under the ground. The drains carry it away."

3. **The Chimneys.**—"What else can you see when you look up to the roof?" "The **chimneys.**"

"Come and show me the chimneys in dolly's house, Harry.

"What do you often see coming out of the chimneys of houses?" "**Smoke.**"

"Where does the smoke come from?" "It comes from **the fires.**"

"What do we call the man who keeps our chimneys clean?" "We call him the **chimney-sweep.**"

"How does he clean the chimney?" "He sends a long brush up the chimney from the fire-place to the very top."

"What does he brush down from the chimney?" "**Soot.**"

"What colour is the soot?" "It is **black.**"

"What colour is the chimney-sweep?" "He is black too, because he gets covered with soot when he sweeps the chimneys."

"What is the soot made of?" "The **smoke** that comes from our fires."

4. **The Doors.**—"When you reach home, how do you get into your house?" "We go in at **the door.**"

"How does your mother know you are there?" "We **knock** at the door with **the knocker.**"

"Come and show me dolly's door, and dolly's knocker.

"What does mother do when she has let you in?" "She closes the door again."

"What does she do with the door at night?" "She locks and bolts it to keep any one from getting in."

Lead the children to tell that this door is called the **front door,** *because it opens into the street in the front of the house. There is another door at the back of the house, leading into the garden. We call this* **the back-door.**

5. **The Windows.**—"What else can you see in the walls of your house besides the doors?" "**The windows.**"

"What are they made of?" "They are made of **glass.**"

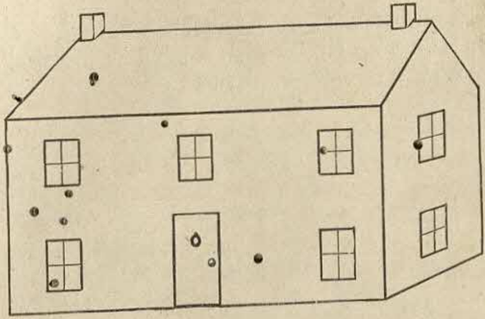
"Why are they not made of bricks or wood?" "Glass will **let the light** into the house, but bricks and wood shut out the light."

"Come and point out the windows in dolly's house. How many windows are there?"

"Why are these windows higher than those?" "They are the windows of the rooms upstairs."

III. How to Draw a House

"We have learned a good deal about dolly's house; and now I will show you how to draw a picture of the house for yourselves."



Sketch on the black-board a simple outline picture of the house, and let the children copy it on their slates, naming the parts as the drawing proceeds.

Lesson XXIII

MY DOLL'S HOUSE

I. Introduction

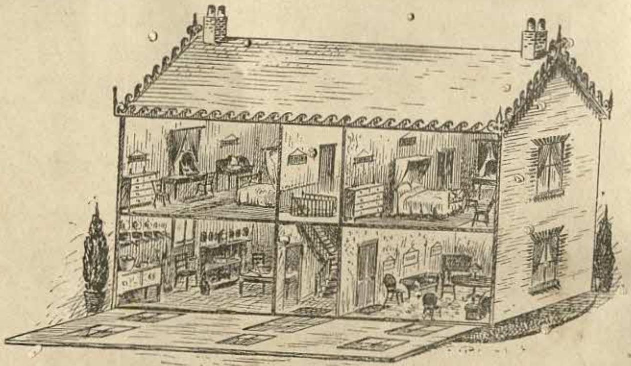
Commence *by leading the children to recapitulate briefly the teaching of last lesson. Let them name and describe the parts of the house to be seen on the outside, telling what each part is made of, what are its uses, and so on. We are now going to learn something about the inside of the house. We will have dolly's house, as before, to help us.*

II. INSIDE THE HOUSE

1. **The Hall or Passage.**—"You told me that when you go home, you knock at the front door, and your mother lets you in. What is the name of that part of the house into which the front door opens?" "The **hall**, or the **passage**."

"Yes, and it is sometimes called the **lobby**.

"What do we call the part on which we walk, when we get inside the door?" "The **floor**."



"What do you find on the floor just inside the door?" "A **mat**."

"What is that for?" "To clean our boots before we go into the rooms."

"What do you see on the wall?" "Some **pegs** to hang our hats and coats on."

"We do not wear our hats and coats in the house. We take them off and hang them up, as soon as we get into the hall."

Remind the children that neat tidy boys and girls always take care to hang their hats and coats up, where they will be found when they are wanted next time.

2. **The Parlour.**—"There are some doors in the hall.

"Let us open one of them and go into the room. It is **the parlour.**

"The parlour, you know, is the best room in the house.

"Come and show me dolly's parlour.

"How many walls are there in the room?" "**Four walls.**"

"What are the walls of your house made of?" "**Bricks.**"

"Can you see the bricks in the wall of the parlour?" "No."

"Why not?" "The walls are **covered with pretty paper.**"

Lead the children to tell that the walls are upright, that the top of the walls are lying-down lines, and that the corners are all square corners.

"What do you see hanging on the walls of the parlour?" "Some **pictures.**"

"There are some pictures on the walls of our schoolroom. Why do we hang pictures on our walls?"

"Tell me again what we call the bottom of the room on which we walk." "The **floor.**"

"What do we call the top of the room?" "The **ceiling.**"

"What colour is the ceiling?" "**White.**"

Pass next to the window and let the children themselves tell its uses, and what it is made of. How do we light our rooms at night when it is dark?

"How do we keep our rooms warm in the cold weather?" "We light a fire."

"What do we call the place where we put the fire?" "The **fire-place.**"

"Why don't we put the fire on the floor in the middle of the room?

"What is over the fire-place?" "The **mantel-shelf.**"

"We stand pretty things on the mantel-shelf. We call them **ornaments.** They make the room look pleasant.

"Now I want you to think of the floor of the room.

"What do we put on the floor of the parlour?" "**A carpet.**"

Have the various articles of furniture dealt with next, calling upon the children to name and describe the toy chairs, tables, etc. of dolly's house, tell their uses, and so forth. Let them arrange the things in proper order.

3. **The kitchen.**—*The toy models of this room and its furniture should be taken next. Compare the kitchen fire-place with the one in the parlour. What is this room used for? What does mother use* **the oven** *for? Call attention to the* **bare floor** *and* **table,** *always kept* **clean** *and* **white**—*to the* **shelves round the walls,** *for holding plates and dishes, basins and jugs, and so on.*

4. **The Bedroom.**—*Show the toy model of this room and its furniture. Lead the children to tell where this room is placed, and how we get to it. What are the stairs made of? What do we use this room for? What do we call the thing we sleep on? What other things are there in the room besides the bed and bedstead? Call upon the children to tell the uses of the various articles. Let them, as before, arrange the furniture in the room, naming and describing each piece as it is set out.*

LESSONS ABOUT MYSELF

Lesson XXIV

PARTS OF THE BODY

"We have been learning about the things around us. Suppose we try now and learn something about ourselves. I want Tommy Smith to come to me. Our lesson shall be about him. I have chosen Tommy because he is a nice, clean boy."

I. THE HEAD

Stand the child in front, and commence by calling attention to his head.

"What do we call this part of Tommy's body?" "His **head.**"

"Now let us have a good look at his head and see what we can find out. First of all, what do you say about the shape of it?" "It is round, something **like a ball.**"

"Look at this covering that grows on the top. What do we call it?" "**Hair.**"

"You should all try and be like Tommy. He is a clean, tidy boy. He keeps his hair smooth and neat.

"Can you tell me what we call this part of his head, which is not covered with hair?" "His **face.**"

Point out the parts of the face, one by one, and lead the children to tell their names, and their uses—**two eyes** *for seeing;* **two ears** *for hearing;* **a nose** *for smelling;* **a mouth** *for speaking, singing, eating, and drinking; and a pair of chubby,* **red cheeks** *to tell us that Tommy is quite well. How would he look if he were ill?*

"Can you tell me what Tommy has inside his mouth?" "He has **a tongue** and **a great many teeth.**"

"What does he do with his tongue?" "He **talks** with his tongue."

"What does he do with his teeth?" "He **bites** and **chews** his food with his teeth."

"What is the colour of his tongue?" "His tongue is **red.**"

"What is the colour of his teeth?" "**White.**"

"Shut your mouth, Tommy. What do you call this part of his mouth that you can see now?" "The **lips.**"

"What colour are the lips?" "**Red.**"

II. THE TRUNK

Remind the children of their lesson on a tree. Lead them to tell that the main part of the tree, which sends out branches above, and roots into the soil, is called the trunk.

"Now I want you to look again at Tommy. Come and point to the biggest part of his body, Fred.

"Quite right. What do we call these, that grow out of the top of it?" "They are the **arms.**"

"What are these that grow out from the lower part?" "They are **the legs.**"

"Now I think you will see why we call this part of the body **the trunk.**"

Have the **shoulders, breast,** *and* **back** *pointed out, and then proceed to talk about* **the neck.**

"The neck is this small part which joins the head to the trunk."

Let the child turn and bend the head in every possible direction, and show that it is the neck which enables us to do all this.

III. THE LIMBS

"The arms are joined to the trunk at the shoulders. We have **two arms,** one on the right side and one on the left.

"What do we call this part of the arm where it bends?" "The **elbow.**"

"What have we at the end of each arm?" "A **hand.**"

"What do we do with our hands?" "We write, draw, and work with our hands, and we use them when we eat our food."

"What do we call these two strong props, which hold the rest of the body up?" "They are the **legs.**"

"What do we call this part of the leg where it bends?" "We call it **the knee.**"

"What have we at the end of each leg?" "**A foot.**"

"What do we do with our legs and feet?" "We **stand, walk, run,** and **jump** with our legs and feet."

Point out the broad **sole** *of the foot, which rests on the ground and supports us, as we stand and walk about.*

"We have another name for our arms and legs. We sometimes call them **limbs.**"

Lesson XXV

WHAT THE BODY IS MADE OF

Commence with a brief recapitulation of the main points of last lesson, calling upon the children to name the parts of the body and their uses.

I. The Skin

"Come along, Tommy. We are going to have another lesson about you to-day. I want to see if we can find out what you are made of."

Place the child in front as before. Call attention to his face, hands, and arms, the parts of his body which can be seen. Lead the class to tell that the part which they can see is only the outside of his body.

"Can you tell me what this outside part of the body is called?" "It is called **the skin.**"

"Look at Tommy's arm, and tell me what is the colour of the skin. "It is **white.**"

"Look at his cheeks and lips. What colour are they?" His **cheeks** and **lips** are **red.**"

"Do you remember our rosy apple? Tommy has a pair of **rosy cheeks.**

"Come and pass your finger along his arm and his rosy cheek, Harry. What else have you learned about the skin by touching it?" "It is **smooth** and **soft.**"

Remind the children how easily the skin may be scratched or broken. Even a pin or a needle will tear the skin.

"How does the place feel when the skin is broken?" "It feels very sore till it gets well. After a time the skin grows again and covers the place; and it is no longer sore."

Lead the children to see from this that the skin takes care of, and protects the parts under it.

Tell that the skin must be kept clean if we wish to be well and healthy. **Dirty people cannot be well.**

II. The Flesh

"Now I want you to look at Tommy's plump arms and chubby cheeks. If you take hold of them and pinch them, they feel soft. Do you know what there is under this smooth skin?" "Flesh."

"Quite right. All **the soft parts** of our body are made of **flesh.**"

Tell of the meat hanging in the butchers' shops. This is flesh—the flesh of the sheep and cow.

"What colour is this flesh?" "It is **red.**"

"But some parts of the meat are white. What do we call all the white part?" "The **white part is fat.**"

"Our flesh, under the skin, if we could see it, is red too, and the fat is white. It is just like the meat we see in the butchers' shops."

III. The Blood.

"What do you see if you scratch or tear your skin?" "**Blood.**"

"Yes; the blood comes out through the broken skin."

"What colour is this blood?" "It is **red.**"

"I daresay your nose has sometimes bled. How did the blood feel as it came away?" "**It felt warm.**"

Explain that this warm, red blood goes into every part of our body. It is carried through the body in pipes. We can see some of these pipes, just under the skin. We call them **veins.** *It is the blood that* **keeps us alive** *and* **warm.**

IV. The Bones

Have the child's arms and hands and head further examined and felt by one or two of the class, for the purpose of eliciting from them the fact that the body does not feel soft in every part.

Lead them to tell that they can feel **hard parts** *in the head, in the face, in the arm, and in the hand. Let them point out the hard parts in the fingers, knuckles, and elbow.*

Explain that these hard parts of the body, which we can feel under the skin and flesh, **are made of bone.**

Show them a bone of some kind. Let them take it and handle it; and lead them to tell that it is **hard, smooth,** *and* **strong.** *They cannot easily break the bone. They have seen bones like this in the butchers' shops, and in the meat on the table at dinner-time. This is one of the bones of a sheep.*

Explain that there are a great many bones in our body; they hold the body up; they make it strong; they help it to move about. Boys and girls could not run and jump and skip, if they had no bones.

Lesson XXVI

THE HEAD

"I THINK we will have another chat about Tommy Smith this morning. Shall we, children?

"Very well. But before we begin, I shall want to see how much you can remember about our other lessons."

I. INTRODUCTION

Place the child in front, as usual, and lead the rest to recapitulate, under the teacher's guidance, as much as is necessary to form an introduction to the new lesson. Have each part of the body pointed out as it is dealt with.

"What is the name of this part of our body?" "The **trunk.**"

"What is this—the highest part of the body called?" "The **head.**"

"What do we call the part that joins the head to the trunk?" "We call it **the neck.**"

"Come and point out Tommy's neck, Fred.

"Quite right. Now try and tell me what use the neck is."

Lead the children to tell that it is the neck which holds the head upright, and the neck which moves it about. Put Tommy through a few movements, such as nodding the head forward and backward, laying it first on one shoulder and then on the other, and turning it round from side to side. All this is done by the neck.

II. The Skull

"Look now at Tommy's head. I think you told me, the other day, that it was round. Well, so it is, or nearly round. But it is not round all over, like a ball or an orange. Pass your hands over his head, Harry, and tell me which part is most like a ball."

The child will be easily led to tell that the top, back, and sides are the roundest parts of the head, and that the face or front part is not round.

"We will leave the face, and think only of the round part of the head. We call it **the skull.** Say after me, '**The top part of the head is the skull.**'"

Point it out carefully on the child's head; and let all the children in the class place their own hands on their heads and say, "**This is my skull.**"

Explain that it is this part of the head which is covered with hair.

Let them look round the class, and lead them to tell that the hair is not all **the same colour.** *Tommy's hair is* **yellow.** *Mary has* **black hair.** *When people get old their hair turns* **white.**

"Now, Harry, I have a question for you. When you put your hands on Tommy's skull how did it feel?" "It felt **hard.**"

"Why did it feel hard?" "Because it is **made of hard bone.**"

"But if you put your hand on his arm that does not feel hard; and yet there is a big bone in his arm. How is that?"

Lead the children to tell that the bone of the arm is covered with thick flesh, but there is very little flesh to cover the bone of the skull. They can feel the bone itself just under the skin.

III. THE FACE

Call upon the children to name the parts of the face as far as they were given in the former lesson, and then proceed in some such way as this:—

"Look at this broad, flat part of the face above the eyes. This is the **forehead.**"

Let the children point to it and repeat.

"The hair, as you see, grows all round it, but the forehead itself is not covered with hair.

"The two eyes are placed below the forehead—one on each side of the nose."

Point out the **eye-balls** *themselves carefully. Show how they are taken care of, by being lodged in hollows between the forehead and the nose. Notice the broad ridge which the forehead makes along the top of each hollow, and the little arches of hair on the edge of it. These are the* **eye-brows.**

"What do we do when the dust blows about?" "We shut our eyes."

"Yes, we do. Let us look at the shutters."

Call attention to **the eye-lids.** *These are* **the shutters,** *which we can pull down when we wish to cover our eyes, so that the dust may not get in. Lead the children to tell that a tiny speck of dirt will cause great pain if it gets in the eye.*

Notice the fringe of hairs—**the eye-lashes**—*at the bottom of the lids.*

Have **the nose** *pointed out next. Trace it, from where it springs between the eye-brows, down the middle of the face. It stands out from the face. Notice the two holes at the end. These are* **the nostrils.**

Elicit, next, from the class all they can tell about **the mouth.** *Call attention to the* **two rows of teeth.** *They are fixed in strong bones*—**the jaw-bones.** *Have them pointed out. The lower one moves up and down to close the mouth and open it.*

The soft, round part in front of the lower jaw, just under the lips, is **the chin.**

"I want you last of all to look at these. See how soft, fat, and chubby they are. I can pinch them in my fingers. What do we call them?" "**The cheeks.**"

"What colour are Tommy's cheeks?" "They are **red.**"

"Yes, they are. Do you remember the red cheeks of our rosy apple? Tommy's cheeks are **rosy,** like **the rosy apple.**"

Lesson XXVII

ARMS AND LEGS

I. INTRODUCTION

Place the boy in front of the class as before and call upon the children to name, and point out, the three chief parts of his body—the head, the trunk, and the limbs.

"What do you mean by limbs?" "The **arms** and **legs.**"

"How many arms have we?" "**Two arms.**"

"How many legs?" "**Two legs.**"

"What do we call this one?" "The right arm."

"Why?" "Because it is on the right side of the body."

"What do we call the other?" "The left arm."

"What is the name of this part where the arm is joined to the top of the trunk?" "**The shoulder.**"

II. SHAPE OF THE LIMBS

Call attention to the child's arm. It is long and round. It is thick at the top, but gets smaller near the hand.

"What makes it thick?" "The bone of the arm is covered with **thick flesh.**"

"What do we call this part of the arm near the hand?" "**The wrist.**"

Now lead them to think of the leg, and compare it with the *arm. The leg too is* **long and round,** *and thicker at the top than it is where the foot joins it. Let them tell that the leg is much longer, thicker, and stronger than the arm. Why is this? Draw from the children themselves that the legs are strong props to* **hold up all the rest of the body** *and carry it about. Lead them to think of the work the legs have to do, whether we stand, walk, run, jump, skip, dance, or play. The legs must be stout and strong to do all this.*

"What is the name of the top part of the leg?" "**The thigh.**"

"What have we at the bottom of the leg?" "**The foot.**"

"Tell me the name of this part, which joins the foot to the leg." "It is called **the ankle.**"

Lead them to compare the ankle with the wrist. Show that the ankle-joint is much bigger and stronger than the wrist-joint. Why?

Call attention to the thick fleshy part known as **the calf** *of the leg. Tell its name, and show that it is big at the top and grows smaller towards the ankle.*

Instruct the child to hold his arm out straight before him, and then put his hand up to his face. Show with a long straight stick, or pointer, that he could not do this, if the arm were all in one piece. It is made of **two parts,** *which are joined together, so that they will bend.*

"Show me the place where the two parts of the arm are joined. What do we call this?" "**The elbow.**"

"Bend your arm at the elbow. Feel the hard bone at the elbow-joint.

"Now think of the leg. Can you bend that?" "Yes."

"Do so; and let me see.

"Quite right. What do we call that part of the leg where it bends?" "We call it **the knee.**"

Lead the children to deduce from this that the leg, like the arm, must be in two parts. Show that there are actually two parts, and that they are joined together at the knee. It is this which makes us able to bend the leg. We must bend the leg when we walk or run, and when we sit down.

Compare the movements at the elbow and the knee.

There is only one kind of movement. We can bend the arm at the elbow, and straighten it; and we can bend the leg at the knee, and straighten that.

III. Movements of the Limbs

Put the child through a series of movements with the arms. Let him stretch them out straight before him—raise them above his head—extend them in a line with the shoulders—lower them towards the floor—and lastly swing them round and round.

Call particular attention to all these movements, and show that in every one of them the arm moves by means of the **shoulder-joint.** *It is the top part of the arm that swings round at the shoulder, and it carries the other part with it.*

Explain that the thigh is joined to the trunk, as the arm is joined to the shoulder; but we do not want to swing our legs round, as we do our arms.

Lesson XXVIII

HANDS AND FEET

I. Introduction

Stand the boy in front, and lead the children to tell, as rapidly as possible, all they can about his arms and legs; their movements, and the kind of work they have to do.

"What have we at the end of each arm?" "**A hand.**"

"How many hands have we?" "**Two hands.**"

"Hold up your right hand, Tommy. Now hold up your left hand.

"What have we at the end of each leg?" "**A foot.**"

"How many feet have we?" "Two feet."

"Hold up your right foot. Hold up your left foot.

"What do we do with our feet?" "We **stand, walk, run,** and **jump** with our feet."

"What do we do with our hands?" "We **write, draw, knit,** and **sew** with our hands. We use our hands when we play. Men and women work with their hands."

II. The Hand

Instruct the child to clench his hand, to unclose it, and then to move his fingers and thumb about in every possible direction. Let him hold a pencil between his thumb and fingers, then give him some large object, such as a hammer, to grasp, or set him to pull at a rope with both hands. This will show the kind of work the hand is meant to do. Then proceed to name the different parts, and show in a simple way how the hand is fitted for its work.

"What do we call this part that joins the hand to the arm?" "We call it **the wrist.**"

"Look at this thick, broad part of the hand, near the wrist.

"The inside part of it is called **the palm** of the hand.

"Feel the palm of your own hand. You cannot feel any bones in it.

"Now turn your hand over, and look at the other side. This is **the back** of the hand. You can feel the bones there. There are **four long bones.** If you close your hand you can see and feel the ends of them. These are **the knuckles.**

"What are these parts which are joined to the knuckles?" "The fingers."

"How many fingers are there?" "**Four fingers.**"

Draw attention to the fact that the fingers are not all the same length. Which is the longest? which the shortest?

"What can we do with our fingers?" "We can **bend** them."

"Bend your fingers now, and show me what you mean. What does this tell us?" "The fingers are not all in one piece."

Set the children to close their fingers down, and show them that each finger is in **three pieces,** *and that the pieces are* *joined together, so that they can bend just as we bend the elbow and the knee.*

Notice the position of **the thumb.** *Show how useful it is in taking hold of things. We can pick up a pin with the thumb and finger, as easily as we can grasp big things.*

Draw attention to the hard shiny **nails** *at the ends of the fingers and thumb. Tell briefly their uses.*

III. THE FOOT

Pass on next to the feet. Call attention once more to the work which the foot is meant to do. It has to support the body and carry it about. Lead the children to tell what we cannot do with the foot. We cannot take hold of things with our feet, as we can with our hands. Let us see how the foot is made.

"What do we call this part which joins the foot to the leg?" "We call it **the ankle.**"

"You can see that all this part of the foot below the ankle looks very thick and strong. We call the front part of it **the instep.** Do you know the name of this back part of the foot?" "**The heel.**"

"The broad part of the foot, which rests on the ground when we stand, is called **the sole.**

"Now tell me what we call these parts at the end of the foot." "**The toes.**"

"How many toes are there?" "**Five toes.**"

"What part of the hand are the toes like?" "**The fingers.**"

"Are the toes quite like the fingers?" "No; the toes are short, the fingers are long."

Tell briefly that this is why we do not use the foot as we use the hand. It is made to stand upon, and not for doing work.

LESSONS ABOUT ANIMALS

Lesson XXIX

A FIRST CHAT ABOUT ANIMALS

"I WANT you to go to my basket, Mary, and see what you can find in it. What do you see there?" "A dear little kitten."

"Bring it to me. We will put it on the table, and have a chat about it."

The little thing will, in all probability, begin to move about as soon as it is placed on the table. Take the opportunity of setting the child to watch it, and "mind that it does not fall off the table"; and then commence as follows:—

"You have all seen little kittens like this one very often. Suppose I bring our kitten to see you next year. Do you think it will look just the same as it looks now?" "No; it will be **bigger**."

"How do you know it will be bigger?" "Because **kittens grow**."

Lead one of the children to tell that she once had a pretty little kitten at home, but that now it is a big cat. It has grown. Elicit from the class that, not only kittens, but boys and girls as well, grow. One day they themselves will be big men and women.

"Look at this stone. How big do you think the stone would be, if I were to show it to you next year?" "It would be **no bigger** than it is now."

"But you say the kitten will be bigger, and you boys and girls will be bigger. Why will not the stone be bigger?"

Lead the children to explain that **they are alive,** *and so is the kitten; but the stone is not alive. They grow* **because they are alive.**

"What makes boys and girls and kittens grow?" "They eat their food, and the **food makes them grow.**"

"I have something on the table that grows, besides the kitten. What is it?" "The **plant** in the flower-pot."

"How do you know it grows?" "Because it was very small at first, and **it is now a big plant.** It must have grown."

"Then, as the plant grows, what else do you know about it?" "It is **alive.**"

"Yes; the **plant** and the **kitten** are **both living things**; they **both grow** and **get bigger.**

"The kitten, you say, wants food to make it grow. What makes the plant grow?"

Lead the children, step by step, to tell that the plant, like the kitten, must have food or it will not grow, it will not live. Plants die without food. Their food is in the soil—the roots suck up food for the plant out of the soil, and this is why we keep the soil round the roots damp.

"Now I want you to look at these two living things—the plant and the kitten. When I put the kitten on the table, I had to stand Mary there to see that it did not tumble down on the ground. Did you have any trouble to keep the plant in its place, Mary?" "No; **the plant does not move,** but the kitten wants **to run and jump about.**"

"Yes, Mary, little kittens are like little boys and girls when school is over. They are full of fun; they love to run, and jump, and skip about.

"Now try and remember that **all living things that can move about are called animals.**

"Plants live and grow in one place and **cannot move away.** Look at our little kitten once more. Mary shall put it on the floor, and we will see how it moves about."

Let the children tell that the kitten has **four legs,** *and that it runs about on these four legs; that they themselves have two legs which they use in walking, running, skipping, jumping, etc. Lead them to name other animals with four legs, such as* *dogs, horses, cows, donkeys, sheep, lambs, rabbits, rats, mice, and so forth.*

Show a little white mouse, or some other tame pet in a cage. There will, generally speaking, be no difficulty in getting the children to bring them for the occasion. Take it out, and show how it moves about by running on its four legs.

A bird in a cage might also be shown. Call attention to its two legs, and to the way in which it hops about on them.

“But how does it get from one side of the cage to the other?” “It flies **across with its wings.**”

Lead the children to tell that they often see birds flying in the air. Some birds fly very high in the air. Some fly very quickly.

Show next a living fish of some kind in a glass bowl.

“Here is a thing that has no legs at all, so it is not like the kitten, and it is not like the bird. But you see **it lives and moves about** in the water. It is **an animal.** Do you know what we call it?

“We call it a fish.”

Lesson XXX

ANIMALS THAT WALK

I. Introduction

“I HAVE brought our little kitten again, to-day, to see you, children. We are going to have another chat about animals.

“But, first of all, can you tell me what we mean by animals?” “All things that **are alive** and **can move about** are **animals.**”

“Well, then, here is our kitten, Mary has brought her little pet rabbit, and Johnny has got his white mouse. Now I tkink we can get on.”

Remind the class that the kitten, the mouse, and the rabbit are all alike in one particular. They all have four legs, and *they use these four legs to move about from place to place. Let the children name other animals which have four legs and move about on the ground. None but familiar well-known animals, which they themselves have seen, should be allowed to be given.*

II. A Hairy Covering for their Bodies

"Come here, Fred, and stroke Kitty with your hand. Now tell me what you learn by stroking her." "She has **a thick, soft coat.**"

"What is the coat made of?" "It is made of **hair.**"

"Quite right; and because the hair is so thick we call it **fur.** Kitty's hairy coat is **thick, soft fur.**

"Now look at Mary's bunny. That seems to have a thick coat too. Come and feel it, Fred, as you did Kitty's coat."

Lead the child to tell that this is exactly the same kind of **thick fur coat** *as the other. It is made of soft hairs which grow very close together on the skin of the animal.*

Let the mouse be next examined with a view to elicit the same fact. Its body is covered with a thick, close-fitting coat of hair or fur.

"Now I want you to think of some of the other animals which run about on four legs. We can't have them all in school, of course, but you have seen them, and I want you to tell me all you can about them.

"Think of the dog first. What kind of a coat is his?" "**A hairy coat.**"

"Have all dogs just the same sort of coats?" "No; some dogs have thick, long, curly coats; the coats of others fit close to the skin. But **they are all made of hair.**"

"Now think of the sheep and the little lambs in the fields. Do you know what their coats are made of?" "**Wool.**"

Show some wool. Tell that this came off the sheep's back, and let the children see for themselves that it is really **thick, curly hair.**

"The horse, the cow, and the donkey have hairy coats too, but their coats are made of thick, short hair which fits close to the body. So then all these running and walking animals **have hairy coats** of some sort."

III. The Bodies are Warm

"Come and lay your hand again on the kitten and the rabbit, Fred, and you may hold the little mouse in your hand if you like.

"Now tell me what you notice about all their bodies?"

"They all **feel warm.**"

"Yes, they do; and your own body feels warm too, doesn't it?"

Remind the children of the lessons about themselves. Lead them to tell of the warm blood in every part of the body. It is this warm blood which keeps our bodies warm. It is the blood in the kitten's body that keeps it warm.

"All animals like the kitten, the mouse, the rabbit, the horse, and others we have mentioned, are alike in having **warm blood** and **warm bodies.**"

IV. Bones Inside their Bodies

Lead the children to think about the build of their own bodies. What can they feel inside the soft flesh? "The hard bones." What covers the flesh and bones of the body? The outside skin. Bring one of the children to the front and let him feel the hard bones inside the body of the kitten and the rabbit. Explain that all the animals we have named are alike in this particular, as well as in others. They have **bones inside their body** *as we have, and* **the body is covered with skin.**

V. They Feed their Young with Milk

Lead the children to talk about Kitty's mother—the old cat. When Kitty was very little indeed, how she took care of it till it grew big enough to run about and take care of itself! It could not grow without food. How did it get its food? "Its mother *gave it milk from her own body." Explain that all the animals we have named* **feed their little ones with milk from their own bodies,** *just as the mother cat does.*

Lesson XXXI

ANIMALS THAT FLY

Show the bird, side by side with the kitten or the rabbit. Lead the children to tell why we call both of them animals. This is not like the animals we talked about in our last lesson.

I. Wings for Arms

"How many limbs have you, Harry?" "**Four limbs.**"

"How many limbs has the rabbit or the kitten?" "Four limbs."

"What do we call the kitten's four limbs?" "**Four legs.**"

"Have you four legs, too?" "No; I have **two legs** and **two arms.**"

"Now look at the bird, and tell me how many legs it has." "It has **two legs.**"

Spread out each wing so that the children may see it, and lead them to tell that the bird has **two wings instead of two arms** *like they have. Birds fly in the air with their wings.*

II. The Body is Covered with Feathers

"What kind of covering has the kitten's body?" "A coat of fur."

"What is fur?" "Fur is thick, close hair."

"What other animals have coats of hair?"

Lead the children to tell that all the animals that walk have hairy coats.

Tell that the flying animals (the birds) **are all clothed with feathers.**

III. THE BODY IS WARM

Let the children feel the body of the bird, and the body of the kitten. Lead them to tell that both feel warm.

"What is it that makes the body of the kitten warm?" "The **warm blood** inside the body **keeps it warm.**"

"There is warm blood also inside the body of the bird, and it is the **blood** which **keeps it warm.**"

IV. BONES INSIDE THE BODY

Remind the children of the build of their own bodies. They can feel the smooth skin on the outside, and they know that under the skin is the soft flesh. But what are the hard parts inside the flesh? "The bones." Let them point out the bones in their hands, arms, and head.

Lead them to tell that all the walking animals have hard bones inside their bodies just as they themselves have.

Now let them feel the bird's body, and show them that these flying animals are like the other animals we have talked about. They all have hard **bones inside their bodies.**

V. THEY LAY EGGS

Show, if possible, a bird's nest. Ask the children whether they know what it is. Let the eggs be kept out of sight at first.

"Who made the nest?" "**Some little bird made it.**"

"Why did the bird make the nest?"

Place the eggs in the nest. Tell that the bird lays the eggs in the nest when she has built it; that she sits on the eggs for a long time to keep them warm; and that at last **little birds come out of the eggs.**

Show them a hen's egg; let them tell what it is, and what bird laid it. If the hen sat on this egg what would come out of it?

"Do cats, dogs, and rabbits lay eggs?" "No; **the walking animals do not lay eggs.** Birds lay eggs."

"But birds **do not feed their little ones with milk** from their own bodies, as we know other animals do."

Lesson XXXII

ANIMALS THAT CRAWL

I. Introduction

Show an earthworm, a snail, and a slug. Place all three on the table. Lead the children to tell that these are animals, and let them give their reasons for saying so. Let them next tell their names. This, of course, will present no difficulty, as they are quite familiar to all children.

"Yes, they are animals; but they are not at all like any of the animals of our other lessons.

"Think of the walking animals. How many legs have they?" "**Four legs.**"

"How many legs have the flying animals?" "**Two legs.**"

"Now look at these. How many legs have they?" "**They have no legs at all.**"

"Yet you see that they move about. This worm would have got to the edge of the table, and perhaps have fallen off, if I had not looked after it.

"The snail and the slug move very slowly. It would take them a long time to get to the edge of the table. But still they do **move about.**"

II. Naked Skin

"I want you now to think only of the worm.

"Where does it live?" "It **crawls** or **creeps about** on the ground."

Lead the children to tell that they have often seen worms creep in and out of the earth in the garden.

Let them describe the **long, round, smooth body.** *The head and tail both pointed—***the skin quite naked,** *having neither hair, wool, nor feathers to cover it.*

[1] *Explain that there are some large animals, called* **snakes,** *just the same shape as the worm, and like it, without legs.*

Show a picture of a snake. (A prepared specimen would, of course, be much better if it could be obtained.) These animals creep or crawl about, just as you see the worm creep now. The skin of their bodies is **naked,** *too, just like the skin of the worm's body.*

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[1] It should be remembered that we are not attempting, at this stage, anything approaching logical classification. The earthworm is taken as a type of the limbless crawling animals, merely because it is familiar to the children, and without any regard to classification.

III. COLD BODY

"Come, now, and take the worm in your hand, Fred. "How does it feel?" "**It feels cold.** It is not warm like the kitten and the bird."

"Tell me, again, what it is that makes those animals warm." "The warm blood inside their bodies makes them warm."

"Now I want you to remember that all these **creeping or crawling** animals **have cold blood,** not warm blood like ours; and their bodies are **always cold.**

IV. BONES

"Our earthworm has **no bones inside its body**; but those great creeping animals, the snakes, which are the same shape as the worm, **have bones inside their bodies, just as you have.**"

Lesson XXXIII

ANIMALS THAT SWIM

I. INTRODUCTION

Show the living fish in the glass bowl. Lead the children to explain why they call this creature an animal. It is a fish. We are going to see what we can learn about it.

"Look at the fish, children, and see if you can tell me one thing in which it is like those long creeping animals we talked about in the last lesson." "The fish is like the worm. **It has no legs.**"

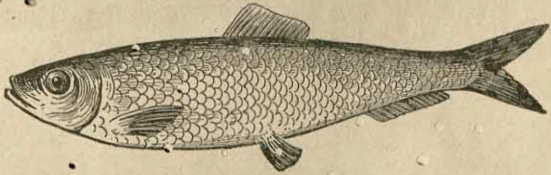
"Quite right. Where does the worm live?" "It **crawls about on the ground.**"

"Shall we take the fish out of the water, and let it crawl about on the ground, too?" "No, the fish **lives in the water.** It would die if it were taken out. It **could not crawl about on the ground.**"

Lead them to think well about this. Both these animals are without legs; but they could not live together. The fish would die if we tried to keep it with the worm on the ground. **It is made to live and move about in the water.**

II. BODY COVERED WITH SCALES

"As we cannot take our live fish out of the water to look at it, I have brought a dead one from the fish shop for you.



"Do you know what we call it?" "It is a **herring.**"

"Take it in your hand, and look at it, Harry. Can you tell me what kind of covering its body has?"

The child will probably fail to find any covering at all on the body of the fish. Call attention to **the scales.** *Let the class examine them. Explain that this is the kind of covering which all fishes have. It helps them in their movements in the water.*

III. Cold Body

"What kind of covering have the walking animals?" "**A hairy coat.**"

"What kind of covering have birds?" "**Feathers.**"

"What do you know about the blood of all these?" "**The blood is warm.**"

"What kind of covering have the creeping animals?" "**A naked skin.**"

"And what kind of blood have they?" "**Cold blood.**"

"Now think of our fish. What kind of covering has it?" "It has **thin scales** all over its body."

"We cannot take our living fish out of the water to feel it. But if we did we should find that its **body is cold.** It has **cold blood,** like the creeping animals."

IV. Fins for Legs

Call attention to the fish, as it swims about in the bowl. It is all the time waving **its tail** *from side to side.*

Notice **the fins** *at the sides of the body. They, too, are always on the move, as the creature swims in the water.*

Explain that the fish **uses its fins and tail** *to move about in the water, just as some animals use their legs in running, and others their wings in flying.*

STAGE II

STAGE II

GIVING FURTHER IMPRESSIONS THROUGH THE EYE

(A) LESSONS ON FORM

Lesson I

LINES AND ANGLES

I. The Right Angle

Commence by ruling a perpendicular line on the black-board.

Call the attention of the children to it, and proceed as follows:—

"What kind of line is this, children?" "**A straight line.**"

"How is it placed?" "It stands **upright**."

"Yes; it is **a straight upright** line. Now I will draw another."

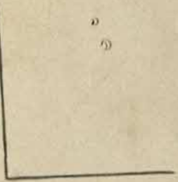
Draw a horizontal line from the end of the first one.

"What can you tell me about this line?" "It is a **lying-down line.**"

"Come and show me the point where these two lines meet, Harry.

"Quite right. What do we call it?" "**A corner.**"

"Yes; we do call it a corner. But I want you to learn a better name for it now. Instead of **corner** you may say **angle.**



"Whenever two lines meet, as these two do, they make a corner, and you must now learn to call the corner **an angle.**

"What kind of corner is this one?"

"**A square corner.**"

"Then what shall we call it now?"

"**A square angle.**"

Lead the children to talk about the square, with its four sides and four angles. All four angles are alike. We call them **square angles** *because they are* **the angles of the square.**

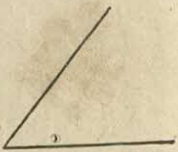
Complete the square on the black-board. Let the children point out the four angles. Have a square of white paper cut exactly the same size, and pin it up over the figure on the board. Show, by turning the paper round, that it always fits the figure. **These square angles are all the same size.**

"Now let me give you another name for them. Whenever you see a square angle, you must call it **a right angle.**

"This first angle which I made with the upright line and the lying-down line is **a right angle.** All the angles in the square are **right angles.** Now tell me where you can see any right angles in this room."

II. ACUTE ANGLES.

Cut an acute angle in paper, and pin it up somewhere on the black-board. Trace a chalk line round the edges of the angle; remove the paper and proceed:—



"Look at the two lines I have drawn on the board. They meet at a point. What shall we call the point, or corner, where they meet?" "An **angle.**"

"The paper, you see, just fits this angle. Suppose we now pin it up over one of the angles of the square.

"Does the paper angle fit this right angle of the square?" "No."

"Is it too big, or too small for the right angle?" "It is too small."

Cut a right angle, in paper, and let the children compare the two. They do not fit.

"How can we make the two fit?" "By cutting a piece off the right angle."

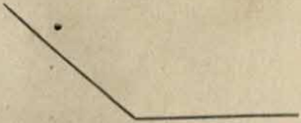
"Very well. I will cut a piece off. Does it fit the other now?" "Yes."

Show a new pencil. Lead the children to tell that, before we can use it, we must make a **sharp point.** *How do we do this? By cutting some of it away. Do it, and show the point. Then turn to the paper. Explain that we had to cut some of the right angle away to make it fit this small angle. We made the angle a* **sharp angle.**

"All angles which are smaller than a right angle are **sharp angles.** But I want you to remember a new word instead of **sharp** for these angles. You must learn to call sharp angles **acute angles. Acute** means **sharp.**"

III. Obtuse Angles

Draw an obtuse angle on the board, and proceed in a similar way, illustrating step by step with paper figures.



Lead the class to distinguish between this and the other angles. The acute angle does not fit the right angle, because it is too sharp pointed—too small. Here is an angle which does not fit the right angle, **because it is too big.**

Show the sharp-pointed pencil, and another that has been well worn down. The children will tell that one is **sharp,** *the other* **blunt.**

"This angle, which is bigger than the right angle, is a **blunt angle.** You must try and remember a new word which means **blunt.** It is **obtuse.** These blunt angles are to be called **obtuse angles. The obtuse angle is bigger than the right angle.**"

Lesson II

ANGLES AND TRIANGLES

I. Recapitulation

Commence with a brief recapitulation of the main facts of last lesson as follows:—

Draw a right angle on the black-board, and call upon the children to tell what it is. Let them give its other name— **square angle**—*and say why it is so called. It is* **the angle of the square.** *It is the kind of angle which an upright line makes with a lying-down line.* **All figures, which are square or oblong shape, have right angles.**

"What do we call an angle which is **smaller than a right angle?**" "An **acute angle.**"

"What does acute mean?" "**Acute** means **sharp.**"

"Why do we call the angle acute?" "Because it is smaller or **sharper** than the right angle."

"Fred shall come to the front and draw an acute angle on the board.

"Very good, Fred. Now show me the sharp point of the angle.

"What do we call an angle which is larger than the right angle?" "An **obtuse angle.**"

"What does obtuse mean?" "**Obtuse** means **blunt.**"

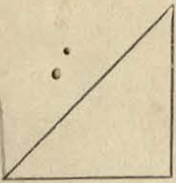
"Yes, the **acute** angle is a **sharp** angle; the **obtuse** angle is a **blunt** angle."

Have an obtuse angle drawn on the board side by side with the others.

II. Triangles

Cut a right-angled triangle out of a sheet of drawing-paper, pin it on the black-board, and proceed in some such way as this—

"I want you to look at this paper figure. How many sides has it?" "**Three sides.**"



"How many angles has it?" "**Three angles.**"

"Come here, Mary, and point out the three sides. Now point out the three angles."

Trace a chalk line round the edges of the paper figure and remove the paper.

"We have drawn a figure on the board, just like our paper figure. See, it has **three sides** and **three angles.**

"I want you to learn a name for this figure. We call it a **tri-angle. Tri** means **three,** and when we say **tri-angle** we mean **three-angles. All figures that have three angles are called tri-angles.**

"Now let us look at the angles themselves. We will begin with this one. What kind of angle would you call it?" "**A right angle.**"

"How would you make sure about it?" "By placing it on one of the angles of a square."

Draw an exact square on the black-board, and let the child fix the paper figure on it. When it is properly placed, show that it fits exactly. Explain that we know it is a right angle because **the angle of a square fits all right angles.**

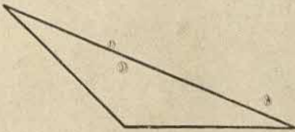
"Now look at the other two angles and see what you can find to tell me about them?" "They are **acute angles.**"

"Why do you call them acute angles?" "Because they are **smaller than a right angle.**"

Call another child to the front, and let him place each of these angles in succession on the angle of the square. Let the class see for themselves that these angles **are smaller than the right angle.**

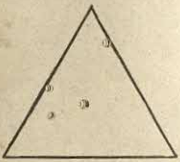
This triangle, then, has **one right angle** *and* **two acute angles.**

Show, next, an obtuse-angled triangle, cut in paper as before. Call attention to the large angle. Let the children give its



name, and their reason for so calling it. Have it compared with the angle of the square, so that the class may see for themselves that it is actually **larger than a right angle.**

Deal in a similar way with the other angles of the figure, and lead the class to tell that this triangle has **one obtuse angle** *and* **two acute angles.**



Conclude with an equilateral triangle, of course omitting the name. Have the angles of the paper triangle compared with the square in the usual way, and lead the class to tell that all three are smaller than the right angle. **They are all acute angles.**

Card-board triangles of various forms should now be handed round the class, and the children briskly exercised in selecting them, one by one, as the teacher calls for them.

Lesson III

CUBE AND BRICK SHAPE

I. CUBE-SHAPE

HAND the small wooden cubes round the class, and set the children to count and see how many sides or faces each has. While they are examining the cubes, pass round some small squares of paper, cut to the size of one of the faces.

"Have you found out how many sides your piece of wood has?" "Yes, there are **six sides.**"

"Now I want each of you to take one of these little pieces of paper and fit it to all those six sides, one after the other. I will first do it with mine; you shall watch me.

"What have you found out?" "The paper fits all the six sides."

"Then what does that tell you about those sides?" "**They are all the same shape.**"

"What else does it tell you?" "**They are all the same size.**"

"Do you know anything which is the same shape and size as they are?" "The piece of paper is **the same shape and size.**"

"Very well. Then suppose we look at the piece of paper.

"How many sides has it?" "**Four sides.**"

"Look at them, and see if you can tell me anything about those four sides." "They are all **the same length.**"

"Now look at the angles or corners. How many are there?" "**Four.**"

"What kind of angles are they?" "**Right angles.**"

"Then our piece of paper has **four sides,** all **the same length,** and **four right angles.** What shape is it?" "It is a **square.**"

"What then is the shape of each side of your piece of wood?" "All the sides are **square.**"

"We say that the piece of wood is **cube-shape,** because it has **six square sides.** It is **a cube** of wood."

II. Brick-Shape

Let the bricks be substituted for the cubes, and proceed to deal with them in exactly the same way. If a paper be cut to the shape and size of one of the faces, the children will readily see that it does not fit all the others. The faces are **not all the same size.**

Examine each face in succession with the aid of its paper pattern, and lead the children to tell that these faces **are not squares,** *because the sides are not equal. Each one has two long sides and two short sides, and all the angles are right angles.* **It is an oblong;** *not a square.*

"How many faces has the brick?" "It has **six faces.**"

"Are all the faces the same size?" "No."

"Are they all the same shape?" "Yes; they are all **oblong.**"

Show by means of the paper patterns that the opposite faces are exactly the same shape and size. The **top** *of the brick is exactly the same shape as* **the bottom**; *the* **two sides** *are exactly the same; and so are* **the two ends.**

"We commonly say things are **brick-shape,** when they are the same shape as this brick."

(B) LESSONS ON COLOUR

Lesson IV

GREEN AND ORANGE

I. GREEN COLOUR

PREPARE beforehand, in separate saucers, with a little water, a sufficient quantity of the three primary colours, red, yellow, and blue.

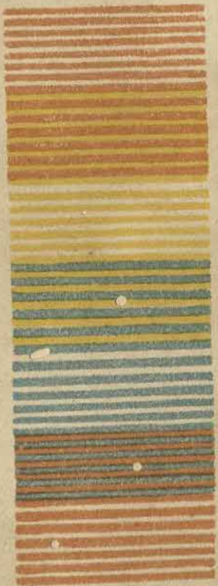
At the commencement of the lesson pin upon the black-board a sheet of clean, white drawing-paper, and proceed thus:—

"I want a boy to come here and help me to do some painting. Who would like to come? Very well, George, you shall come."

After stirring each of the colours with a piece of stick, to see that it is well mixed, hand the child a brush, and instruct him to dip it in the blue, and then paint, as well as he can, a broad patch on the paper.

Call upon the children to tell the name of this colour.

Let one or two of them come to the front and select balls of the same colour from the kindergarten box on the table.



Proceed, next, in a similar way with the yellow. Let the boy make a yellow patch (with a fresh brush) on another part of the paper, the class, as before, telling the name of the colour, and selecting balls of that colour from the box.

Now instruct him to take the same brush, and paint the yellow colour on the patch of blue. None will be more astonished than the boy himself. When he and the rest of the class have got over their surprise, the teacher will proceed thus:—

"What colour is this?" "It is **green.**"

"But I did not tell George to paint the paper green. I gave him this **yellow paint** to paint with. How has he made it green? Let us see if we can find out all about it."

Take a small spoonful of the blue colour out of one saucer, and rather less of the yellow out of the other, and mix them well together, so that the children may see the result. The mixture is a bright green.

"Now what have we learned from this?" "We have learned that **by mixing blue and yellow** together, we can make **a new colour—green**—which is not like either of them."

The earlier lessons have made this colour quite familiar to the children; still one or two of them may be brought to the front, and made to select green balls from the table. Call upon them also to tell that green is the colour of the grass, as well as of the leaves of trees, and of all plants.

II. Orange Colour

Proceed, in a similar way, to introduce the next colour. Fresh brushes and a clean sheet of paper should be used this time to prevent mistakes. Let another child take a turn in assisting teacher; and when all is ready instruct him to paint a red patch on the paper.

The class, as before, should be made to tell all they can about this colour; and they should also be allowed to come to the front to pick out red balls from the box.

Show them again the yellow paint in the other saucer. They have already seen it, and know all about it.

Instruct the boy to dip the clean brush well into the yellow paint, and daub it over the red patch on the paper.

"You see we have made another change. Harry painted the **yellow over the red,** and now we have got **a new colour.** It is **not red,** and it is **not yellow.**

"Have you ever seen anything that is just this colour?"

Show the orange. Let the children tell what it is. Place it by the side of the new colour. Lead the class to tell that this new colour, which Harry has made, is just the colour of the orange.

"What colour would you call it? Is it red?" "No; it is not red."

"Is it yellow?" "No; it is not yellow."

"Quite right. We call this **orange colour, because it is the same colour as the orange.** Suppose we see how it is made."

Take a small spoonful of the yellow colour, and mix it with rather more than half a spoonful of red. Let the children see what takes place. The mixture will be a bright orange colour.

"We have learned then that when we mix yellow and red together we get a new colour, which we call **orange colour,** because **it is the same colour as the orange.**"

Lesson V

GREEN, ORANGE, AND PURPLE

Prepare in separate saucers some of the red, blue, and yellow colours, as in the preceding lesson. The brushes used on that occasion should have been well cleaned and dried before they were put away.

Commence with a brief recapitulation of the subject of that lesson. Lead the children to tell the names of the three principal colours, which they were taught first—red, yellow, and blue.

"What are the names of the two colours we made for ourselves in the last lesson?" "Green and orange."

"Show me some green thing in our room.

"Can you tell me how to make green paint?" "**Mix blue and yellow paint** together."

"How did I make the orange-coloured paint?" "**By mixing yellow and red paint** together."

"Why is it called orange colour?" "Because it is just the same colour as an orange."

"Quite right. We make green **by mixing** blue and yellow; and we make orange **by mixing** yellow and red.

"This is why we sometimes call them **mixed colours.**

"Green is **a mixed colour,** and orange is **a mixed colour.**

"Red, yellow, and blue are the **three principal colours.** We cannot make them by mixing any other colours.

"I am now going to show you how to make another mixed colour."

Call one of the children to the front, and let him paint a red patch on the paper, just as was done in the last lesson. Then instruct him to dip another brush into the blue paint, and daub this over the red patch.

Draw attention to the new colour which results. It is not red; it is not blue.

"We call this new colour **purple.** How did Fred make it?" "He mixed the **blue** and **red** colours together."

"Let me see if I can do it by mixing the colours in this saucer as we did in our last lesson."

Take a spoonful of blue and another of red, and mix them in the saucer. A beautiful purple colour will be the result.

"Yes; you see we can make this new colour, **purple,** by **mixing the two colours, blue and red.**

"What kind of colour shall we call purple then?"

"**A mixed colour.**"

"Now tell me how many of these mixed colours we have made?" "**Three.**"

"What are they called?" "**Green, orange,** and **purple.**"

"How many principal colours are there?" "**Three.**"

"Which are they? "**Red, yellow,** and **blue.**"

N.B.—*The relation of the three mixed colours to the principal colours from which they are formed may be very graphically shown, in the following way, with soft red, yellow, and blue chalks, on a sheet of drawing-paper.*

Commence by drawing, near the top of the paper, with the red chalk, a number of horizontal lines, about an eighth of an inch apart. Let these be followed by an equal number of yellow lines, similarly placed; and below the yellow lines add the same number of blue lines. These three bands of lines will show the arrangement of the three primary or principal colours.

Draw horizontal red lines through the lower half of the blue band, and continue these lines through an equal space below the column.

In a similar way, continue the blue lines upwards through the lower half of the yellow band; and the yellow lines upwards through the lower half of the red band.

The column is now composed of seven bands, which taken from the top are **red—red and yellow mixed—yellow—yellow and blue mixed—blue—blue and red mixed—red.**

Of course all this preparation should be done beforehand. It will only be necessary to draw the attention of the children to the arrangement of the colours.

If the bands of mixed colours be rubbed lightly, the orange, green, and purple will be shown in their proper relations to their primary colours.

Lesson VI

BROWN AND GREY

I. RECAPITULATION

"I WANT you to think about those new colours we made the other day, children. What are their names?" "Green, orange, and purple."

"What kind of colours did we call them?" "**Mixed colours.**"

"Why did we learn to call them mixed colours?" "Because we made them **by mixing other colours together.**"

"What kind of colours are those which we mixed together?" "**Principal colours.**"

"Can you tell me the names of the principal colours?" "**Red, yellow,** and **blue.**"

"How many colours did we mix together to make green?" "**Two colours.**"

"Which two colours?" "**Blue** and **yellow.**"

"How many did we use to make orange?" "**Two; yellow** and **red.**"

"How many to make purple?" "**Two; blue** and **red.**"

"So then we made each of those mixed colours with two of the principal colours."

II. BROWN

"We are going to do some more mixing now."

Mix in a saucer, and stir well together, small quantities of red, yellow, and blue paints, which have been prepared, as usual, in readiness for the lesson.

N.B.—*The quantities of the three primary colours may vary, according to the kind of brown required. If a deep warm* *colour is wanted, red must be the principal constituent; for a light brown there must be more yellow than red or blue; and to make a dark brown, there must be an excess of blue. The children, however, need not be troubled with this, at the present stage. All they have to learn here is that* **the result of the mixing is a new colour.**

Let them see the three colours put into the saucer for mixing. Let one of them come to the front, and after stirring the mixture well together, paint the new colour on the sheet of white paper.

"I want you all to look well at this colour. It is a new one; it is not like any of those which I have shown you. We call it **brown.**

"Like the green, orange, and purple, it is **a mixed colour,** for we made it **by mixing other colours together.**

"How many colours did we use to make each of those?" "**Two colours.**"

"How many did we mix together to make this brown colour?" "**Three.**"

Lead the children to name and point out brown-coloured objects, as far as they can. This will be somewhat difficult for them, as there are so many shades of brown, and we cannot enter into that part of the subject at present. The teacher must use her discretion in the selection of examples, so as not to confuse the simple ideas the children have formed about this colour.

III. GREY

Proceed now, in a similar way, with the preparation of this colour. It may be made by mixing black and white with the addition of a little red, yellow, or blue, according to the shade of grey required. The selection of the particular constituents is of course the teacher's affair, and does not concern the children. She will make a grey (of the shade she desires to show) by mixing three colours—that is all. Have the colours prepared and mixed together in the usual way, and call upon the class to note the resulting colour.

"Here is another new colour. We call it **grey.**

"It is, as you have seen, **a mixed colour**; for we made it **by mixing other colours together.**

"How many colours did we mix together to make grey?" "**Three.**"

"Then grey is like brown in this sense, for we also used three colours to make brown."

Conclude the lesson by exercising the children to name and point out grey-coloured objects as before.

The whole of the colours we have dealt with may now form the subject of a series of revisal lessons, in which the kindergarten balls, skeins or reels of silk, cotton, and worsted, strips of paper, etc., may take a prominent part.

If squares, oblongs, triangles, circles, rings, etc., of the various colours can be obtained, these revisal lessons may be made very interesting by combining "form" and "colour" in the recapitulations.

FIRST LESSONS ON SIZE AND MEASUREMENT

Lesson VII

LENGTH, BREADTH, AND THICKNESS

I. LENGTH

*Show one of the brick-shaped objects described in Lesson III.—a common building brick will do as well as anything. Lead the children to tell that it has six faces—that all the faces are the same shape—*__oblong__*—but that they are not all the same size. The opposite faces are* **the same size,** *as well as* **the same shape.** *This much they learned in the earlier lesson; and on this foundation the teacher may now proceed.*

"We are going to think about the size of things, to-day, more than their shape. Come and point out the longest side of the brick, Harry.

"How do you find out that this is the longest side?" "By looking at the brick."

"Could you find out in any other way?" "Yes, by measuring it."

"What would you use to measure it?" "A piece of string or tape."

"Come and show me how you would do it. I will give you one of these strips of red paper to measure with. It will do as well as tape."

Let the child proceed, in his own way, to measure the side of the brick, by placing the paper along one edge of it. When he has done it, cut off the paper to the required length.

"What does this paper tell us?" "It tells us **how long** the brick is."

"But you have not shown us yet that this side is the longest. How will you do that?"

Lead him to explain that, to do this, he must place the paper along the other edges of the brick. Let him do it, and show that the paper is much longer than either of those edges.

Lay the red paper carefully on the table.

"This paper measures **the longest side of the brick.** It is just as long as that side. We call this **the length of the brick.**"

II. Breadth

"Who would like to come and measure another side of the brick?

"Well, Mary, you shall come. As Harry had a red paper, you shall have a blue one."

Show the child, as before, how to measure this side. Let her compare her blue paper with the red one. The red one is much longer than this.

"What does Harry's red paper tell us?" "The **length** of the brick."

"What does that mean?" "It tells us **how long** it is."

"Quite right; and your blue paper tells us **how broad** or **how wide** it is. We say it measures the **breadth** or the **width** of the brick."

Place this one on the table by the side of the red paper.

Proceed next to draw oblong figures of different dimensions on the black-board, and call upon the children, one by one, to measure the length and breadth of these with their red and blue papers.

Draw several figures, side by side, and let the children measure and compare them as to width in order to lead them to distinguish between **broad** *and* **narrow.**

Strips of paper of different width may then be handed round the class, and the children set to measure them for themselves. Call upon them to hold up the longest piece they have—then a broad piece—then a narrow one, and so on.

III. THICKNESS

"We are now going to look at the brick once more. We know how to measure its **length** and its **breadth**; but there is something else for us to learn."

Let one of the children take a fresh strip of paper—a yellow one perhaps—and show him how to measure with it along another edge of the brick from the top to the bottom corner. Explain that he is now measuring **the thickness of the brick.** *Place the yellow paper on the table side by side with the red and blue ones.*

"Hold up the red paper, John. What did we measure with that?" "We measured the **length** of the brick."

"Now hold up the blue one. What did we measure with that?" "The **breadth** of the brick."

"Now hold up the yellow one. What did we measure with that?" "The **thickness** of the brick."

Show next a piece of deal board, and compare it as to thickness with the brick. It is not so thick as the brick. We say the brick is **thick** *and the board is* **thin.**

Compare the board again with a thin strip of wood or a piece of card-board. We should then say that the board is **thick** *and the other things* **thin.**

The card-board again might be compared with a sheet of drawing-paper ; the drawing-paper with a piece of ordinary writing-paper, and so on.

Lesson VIII

THE FOOT-RULE

Show the red, blue, and yellow papers, which were carefully saved from last lesson. Produce the brick, and lead the class to tell what they learned from the lesson. The papers were used to measure the brick. One paper told us the length, another the width, and another the thickness.

"Now let us think about these strips of paper. We could not have found out either the length, the breadth, or the thickness of the brick without something to measure the sides with. We used these pieces of paper.

"But what else might we use?" "Pieces of string, tape, ribbon, or stick would do just as well."

"I have something here that will do better than any of them."

Produce the foot-rule. Show it without telling its name, and lead the children themselves to describe it, as to the following points :—It is a long, thin strip of smooth yellow wood. It is narrow, like a piece of ribbon or tape.

Explain that we call it **a foot-rule, because it is about as long as a man's foot.** *Say nothing, at present, about the division into inches. That must come later on.*

Have a sufficient number of strips of card-board, exactly a foot in length, for distribution round the class. These should not be marked in any way to show the divisions of the foot. Before they are handed round to the children, let them be laid on the table side by side with the foot-rule. Show that they are all the same length—the length of the rule itself.

"What do we call this?" "**A foot-rule.**"

"Why do we call it a foot-rule?" "Because it is about **as long as a man's foot.**"

"What can you tell me about these pieces of card-board?" "They are the same length as the rule."

"How long is that?" "A foot long."

"Now you shall have these pieces of card-board, and we will learn how to measure things with our foot measure."

Before setting the children to work, the teacher should fix upon some object in the schoolroom, and proceed to measure it herself. It is very essential, at this stage, that the measurements should always give an exact number of feet.

Taking the schoolroom door as a commencement, proceed in some such way as this:—

"I will begin by measuring this door. Then you will know how to measure other things afterwards.

"Come and show me where you would measure the length of the door, Norah. Quite right. Now show me where you would measure the breadth of it. Right again.

"Now let us find out what the length of the door is."

Show the children how to measure with the rule, marking the foot spaces in chalk on the edge of the door itself.

"Let us see how many times I have moved my rule. One, two, three, four, five, six times. Then what does that tell us?" "It tells us that the door is **six feet long.**"

"Now let us find the breadth of the door."

Proceed in exactly the same way to measure across the door. Let the children tell its width—one, two, three feet. "The door is **three feet wide.**"

The children may now be allowed to use their card-board strips to measure other objects in the room. Remind them again, before they commence, that their measure is just the same length as the rule. It is a foot long. Every space that it marks will measure a foot in length.

A few sheets of paper cut to different sizes (but always an exact number of feet) would serve the purpose admirably. These might be pinned on the black-board, or on the wall, or even on the floor, and the children could measure them, one by one, as they had seen the teacher measure the door.

By allowing the children to measure objects with two dimensions, **the ideas of length and breadth,** *which were taught in the last lesson, are kept prominently before them. Farther exercises in mere length can be given, by setting them to measure pieces of string, wire, tape, or any other available objects of the kind.*

Lesson IX

THE YARD AND THE INCH

I. How to measure Big Things

Pin up in front of the class one of the long strips of paper, which were used in the last lesson. Call upon some child to come forward, and measure the length of it with his strip of card-board. Draw attention to the way in which he measures. He moves his card-board measure three times.

"Well, John, have you found out the length of it?" "Yes; it is **three feet long.**"

"How did you learn that?" "My card-board measure is one foot long, and I had to move it three times."

"I want you to come and measure this long stick for me with your card-board measure.

"How long is the stick?" "It is **three feet long.**"

"John is right; and now you must all look at this stick. It is three feet long. I will put chalk marks on it to show the three feet.

"We are going to use the stick as a new measure. We shall call it **a yard.**

"How long is the stick?" "**Three feet.**"

"What is the other name for a length of three feet?" "**A yard.**"

"Then our stick will serve for **a yard measure.** See how easily I can measure the paper with it. I have to use it only once, because the paper is **three feet,** or **one yard** long.

"Suppose we now use this yard measure to find out the length of our class-room."

Proceed to measure the wall of the room, calling upon the children to count the yards, as they are measured—one, two, three, four, five, six, seven, eight.

"Then, what is the length of our class-room?" "Eight yards."

"Now let us measure it across this way. What will that tell us?" "It will tell us the **width** of the room."

Measure this side of the room, letting the children count the yards as before—one, two, three, four, five, six.

"But see, I have not finished. I have measured six yards, and there is a piece left, but not enough to make another yard. What shall I do?"

Lead the children to tell how to measure, with the foot-rule, the piece that is left. Let one of them measure it.

"Have you found out what that piece measures, Harry?" "Yes; it measures two feet."

"Then, tell me how wide our room is altogether?" "It is **six yards and two feet wide.**"

II. HOW TO MEASURE LITTLE THINGS

Introduce this part of the lesson by setting one of the children to try to measure, with his strip of card-board, the length of some object, which is not an exact number of feet long.

He, of course, measures the one or two feet without any difficulty, but he is puzzled when he finds that there is a piece over. His card-board will not tell him how long this piece is.

Show, now, some other strips of card-board, exactly like the first, but with the inches plainly set off on one side. Hand these round to the children for examination.

Let them count for themselves the spaces marked out, and then lead them to tell what they have discovered.

"How many spaces are marked in your measure, Fred?" "**Twelve spaces.**"

"How many in yours, Mary?" "Twelve."

"Yes; there are **twelve spaces** in all of them.

"Now I want you all to look carefully at your measures, and see what you can find to tell me about the spaces." "They are **all the same length.**"

"Yes; they are all the same length. We call **each space an inch.**

"How many inches are there in your measure?" "**Twelve inches.**"

"What is the length of your measure?" "**A foot.**"

"Quite right. Now you know that there are **twelve inches in a foot.**"

The children may now be led to see that it is very easy to measure the object, which they could not measure with the other strip of card-board. Let them assist in measuring it. After they have marked off the feet, the inch spaces on their new measure will easily give the length of the piece that is left.

An ordinary foot-rule may now be shown, and its uses explained, after which the children may be exercised in measuring any of the small objects around them, at the teacher's discretion.

N.B.—*It would be well to supplement this lesson by another, dealing entirely with the practical measurement of the length, breadth, thickness, or height of a variety of objects, large and small. In this way the value of the foot, yard, and inch would become more and more intelligible to the children.*

LESSONS ON PLANTS

Lesson X

THE ROOTS OF PLANTS

I. INTRODUCTION

"WE are going to have a chat about plants to-day. But I must first of all find out how much you yourselves can tell me about them.

"What can *you* think of, Harry?" "Plants **live and grow** in the ground."

"Quite right. Now, Fred, what can *you* tell me?" "Plants **cannot run about** like animals can. They **cannot move out of the soil.**"

"Right again. Now what else have you to say?" "The plant has **a root,** which **holds it in the ground;** that is why it cannot move away."

"Do you remember any other parts of the plant?" "The **stem, leaves,** and **flowers.**"

"Harry told us just now that plants live and grow. How do you know that plants are living things?" "**Because they die** if we do not take care of them."

"Is the plant on the table dead or alive?" "It is alive."

"How would you know a dead plant from a living one?" "The **leaves** of a dead plant **dry up,** and **lose their green colour;** and they **soon fall off.**"

"How do you know that plants grow?" "Because they are very small when we first put them in the ground; but **they get bigger and bigger.**"

"What makes the plant grow?" "**Its food** makes it grow."

"How does the plant get food?" "The roots **suck up food** for the plant out of the soil."

"How can we help our plants to get their food?" "By watering the soil."

"How does that help them?" "The roots cannot take in any food if the soil is dry; they can feed the plant only **when the soil is kept damp.**"

"Now I think, as you have answered so well, we will try and learn something more about roots."

II. SIMPLE ROOTS.

Have in readiness a few common annuals from the garden. Shake the soil from the roots, and hand them to the children for examination.

Call attention to the general appearance of this part of the plant—so different from the green parts above the ground. **The roots are never green.**

Notice that the root consists of **a great number of strings,** *which stretch downwards from the stem. Lead the children to tell that the roots stretch downwards into the soil, because they are* **seeking for food** *for the plant.*

A hyacinth, growing in a long glass filled with water (as we frequently see these plants growing in town), would give the children a capital notion of the root-strings.

"All the plants on the table have **stringy roots** like these.

"Have you seen father dig up the garden and sow seeds in it?" "Yes."

"When does he do that?" "As soon as the snow is all gone and the fine weather comes."

"Do you know how long his plants live?" "They live till the cold weather comes again, and then they die."

"Quite right. Now I want you to remember that all those plants which **die in the cold weather** have these **stringy roots.**"

III. THICK, SOLID ROOTS

Produce the carrot and turnip. Call upon the children to tell their names and say what they can of their uses.

"Now I wonder whether any of you can tell me what this carrot really is?"

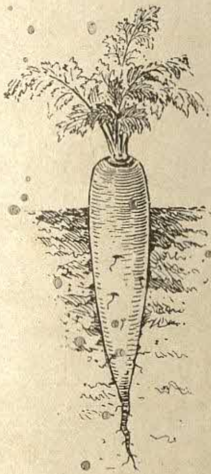
Show a good picture of the growing carrot and turnip, in which the roots are seen stretching down into the soil.

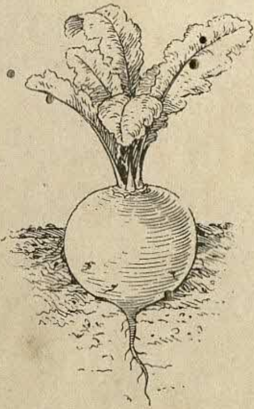
"I think the picture has told you what this carrot on the table really is." "It is **the root** of a plant."

"Yes, it is, and so is this turnip. But they are not at all like the stringy roots of the other plants. They are **thick, solid roots.**

"Plants, which have roots like this carrot, **do not die when the cold weather comes.** They only go to sleep, and spring up again when the cold is all gone.

"These thick, solid roots **feed them**, and keep them alive all the winter till they can get food again out of the soil."





Lesson XI

LEAVES AND BUDS

I. INTRODUCTION

COMMENCE by leading the children to talk about the trees.

They are great tall plants; they have a root, a trunk, branches, and leaves like other plants. Our lesson to-day is to be about the leaves.

"What makes the trees look so beautiful in the summer?" "They are full of green leaves."

"How do they look when the snow is on the ground?" "They look bare; they have no leaves then."

"Can you tell me, Harry, what becomes of their leaves?" "**They fall off** when summer is over."

"How do the leaves look when they fall off?" "**Dry and brown.** They are dead."

"When do the leaves come again?" "As soon as the cold weather is gone."

N.B.—*The natural objects for illustration here will, of course, be entirely dependent upon the season. If the lesson is given in the autumn, the teacher will naturally turn to the* **fallen leaves** *for her illustration, comparing them with the* **green growing** *leaves which have not yet been shed.*

If the season be spring, on the other hand, a supply of **twigs with their bursting buds** *must be provided for examination by the class.*

It would be well to take the lesson for the first time in one season, and revise it in the other, so that leaves in all stages of their growth and decay might be seen.

We will imagine the lesson to be given in the spring-time. The teacher would proceed in this way.

II. Buds

"Then, as the ice and snow and cold weather have all gone now, it is time for us to watch the trees.

"Which of you have looked at the trees lately?

"That's right; I am glad to know that you all use your eyes as you go about. That is the way to learn.

"Tell me what you have seen about the trees lately, John." "The new leaves are coming; the trees begin to look green again."

"What is the shape of the new leaves?" "We cannot see the shape of the leaves. They look like **little, round, green balls** all over the branches of the trees."

Draw attention to the twigs lying on the table. Lead the children to tell what they are, and what the little green knobs on them are. They are the **new leaves** *coming on the twigs, like those John told us about just now.*

"These little green knobs are called **buds.** Those that you see on the trees **will soon be leaves.** Let us see what we can learn about them.

"Do you know what this is?" "It is a cabbage."

Call attention to its shape. It is round like a ball. Notice too that it feels hard and close. We will find out what it is made of.

Show the outside leaf. Proceed to strip it off. Hold it up for the class to see. It is a cabbage-leaf.

Strip the leaves off, one by one, and let the children see what the cabbage consists of.

It is made of a great number of leaves folded closely one over the other, so as to form a ball.

"This **cabbage is a great bud.** I brought the cabbage to show you, because it is large, and you are all able to see the leaves, as I strip them off, one after another.

"These little buds on the twigs, and all those you see on the trees now, **are made of tiny leaves folded over one another,** just like the leaves of this cabbage. But we could not see them so well as we can see the leaves in the cabbage, because they are so small.

"If you watch the buds on the trees for a few days, you will see them **swell and get bigger and bigger,** and at last they will **burst open,** and the little **leaves** will spread themselves out.

"Harry told us that the leaves die and fall off when summer is over. So they do. When the time comes I will show you some more twigs. You will then see the place where the leaf has been, and close by it you will see **a little brown knob or ball.**

"What do you think that is? I will tell you. It is **the little bud,** which is to grow into **a new leaf** next year. It is only covered with that hard brown skin **to take care of the young leaves inside** till the frost is all gone."

Before closing the lesson lead the children to tell that there are some trees which do not look bare in the winter. They are always covered with green leaves. They are called **evergreens,** *because they are always green.*

Assist the children to mention a few of these, showing specimens of as many as possible.

Lesson XII

BUDS AND FLOWERS

I. Introduction

Introduce the new subject by referring to the lesson on leaves and their buds. Lead the children to tell what they know, in some such way as this:—

"What becomes of the leaves of the trees when summer is over?" "They **turn brown, die,** and **fall off.**"

"How do the branches and twigs of the trees look then?" "They look bare."

"If you looked carefully at one of these bare branches or twigs, what would you see?" "Some **little round knobs** just where the leaves had been."

"What colour would you find them?" "**Brown.**"

"If you touched them with your fingers, how would they feel?" "**Hard.**"

"What are they?" "**They are buds,** which will grow into new leaves in the next year."

"If we picked one of them off and cut it open, what should we find?" "**Tiny little leaves folded over one another** just like the leaves of a cabbage."

"What is the use of that hard brown skin outside?" "It is **to take care of the little green bud inside,** till the cold weather has all gone."

"What happens then?" "The bud begins **to grow and swell**; the hard brown skin drops off, and after a time **the little leaves burst open.**"

II. Flowers and their Buds

"We are now going to have a chat about some other buds; but I shall first want to see what you can tell me about these pretty flowers.

"What are their names?" "Buttercups and daisies."

"I daresay you remember our lesson about these flowers. Try and tell me all you can about them."

*Hand some specimens round the class, and lead the children step by step to tell that the cup of the first-named flower consists of five smooth, shiny, yellow leaves—***the flower-leaves.** *Let them strip off these flower-leaves and find the five small green leaves outside them.*

They will probably tear some of the petals as they pluck them off. This will afford an opportunity of showing that they are very soft and tender, and would be easily hurt.

Call attention to **the outside ring of five green leaves.** *They form a little cup to hold the tender flower-leaves. Lead the children to notice too that the flower grows at the top of a green stalk which holds it up from the ground, where it can get plenty of light and air.*

Treat the daisy in exactly the same way, calling special attention to the calyx[1] *of green outer leaves, which form a little cup to hold the rest of the flower.*

Now show some unopened flowers in various stages of development. Let the children see that they are completely enclosed in a green outer covering. They look like little knobs on the tops of the green stalks. Take one of them and open it carefully so that the children may see. If possible, place one or two on a sheet of paper, and hand them round the class for inspection.

"Now I want you to look carefully at these little green knobs, and tell me what you see inside them." "There are **some little yellow leaves folded up** closely inside the green ball."

"What do you think these yellow leaves are?" "**The yellow flower-leaves** of the buttercup."

"Yes, they are; and this green outside coat is to take care of them till they grow strong enough to bear the sun, the wind, and the rain. The outside coat is really made of **five little green leaves, folded together.** When the flower opens they form that **little green cup** under it.

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[1] *N.B.*—The children would not, of course, be troubled with the name.

"Now who can tell me what this little folded knob is?" "It is **the bud of the flower.**"

"Yes. Flowers, like leaves, come at first as little buds, and when they are strong enough they burst open."

There should be an ample collection of flowers and flower-buds at hand, in as many varieties as the season of the year will permit, that the children may be led to enlarge upon what they have learned from the simple flowers which have formed the subject of the lesson.

Lesson XIII

FRUIT AND SEEDS

I. INTRODUCTION

Show a ripe apple. Lead the children to tell that it grew on a tree; that the flowers came first, and after them the apples.

Explain that we call the apple the fruit of the tree on which it grows.

Remind them of our lesson on the flowers, and tell them that we are now going to learn something about the fruit that comes after the flowers.

"If we look at an apple-tree in the early spring-time, when the frost and snow have all gone, we shall see that the twigs are full of **little round knobs.** What are these?" "They are **buds.**"

"Yes, they are buds; some of them are **leaf-buds,** and some are **flower-buds.**

"In a short time all the buds burst open, and then the tree is full of **green leaves** and **beautiful flowers.** The flowers do not last very long. But every flower that once grew on the twig leaves a **little round apple** behind in its place.[1]

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[1] Strictly speaking, the apple-flower does not die and fall off in the same sense as the flower of the buttercup does; for the calyx of that flower really forms part of the pericarp of the apple. The ovary of the former is inferior, that of the latter is superior. Such technical distinctions as these, however, need not trouble us here. The apple is chosen as being a common fruit, and one which these little children can handle and examine for themselves.

"Look at this stalk. It held the apple to the tree while it was growing. But before the apple came it was **the stalk of the pretty flower.**"

II. THE FRUIT

"Now let us see what we can learn about our apple."

Let the children examine it, and lead them to describe its ball-shaped form, and smooth, shiny appearance. Call their attention to its colour, and let them tell that as the fruit ripens it changes colour. It was at first green all over.

Peel off the outer skin and show the fleshy, juicy part beneath.

Let the children taste this, and tell, in passing, what they can of the taste—**partly sweet** *and* **partly sour.** *All fruit is at first sour; it becomes sweet as it ripens.*

As our business to-day, however, is not with this part of the apple, proceed to cut it all away so as to lay bare the inner core as clean as possible.

Show that this inner part of the apple is really a closed case or box. Call attention to the thick, hard, strong material of which it is made, and so lead up to the contents of the box.

III. THE SEEDS

"When do we put things away carefully in a strong box?" "When we want to take great care of them."

"Just so. Then as we have found this strong box in the very middle of the apple, perhaps it is meant to take care of something. Let us see.

"I will cut the box open. What do we see inside?"

"A great many **little black things.**"

"Do you know what these are?" "They are **the seeds.**"

"What does father do with seeds in the garden?"

"He puts them in the ground, and they grow up into little plants."

"Would these seeds grow if we put them in the ground?" "Yes."

"What do you think would grow from them?" "**Little apple trees** would grow from them."

The teacher should now be prepared with a good supply of fruits, of various kinds, according to the season of the year, for further illustration. There need be no difficulty in getting a good variety. Some of the fresh stone fruits would be easily available at one period; currants and gooseberries at another; while oranges, lemons, prunes, and dates are always available. Other seed-vessels, such as peas, beans, nuts, poppy heads, the capsules of the wallflower, etc., could also be easily obtained.

LESSONS ON THE SIMPLEST NATURAL PHENOMENA

Lesson XIV

THE SKY

I. INTRODUCTION

To render this lesson effective, the teacher would do well to select a bright clear day for it, so that the children may be able to approach it, with their minds fresh from what they have seen. Commence by leading them to talk about their run to school. How bright and cheerful everything looked. When they raised their eyes above them, they saw everywhere the clear blue sky.

"To-day we are going to see what we can learn about this beautiful sky.

"You saw the sky above you on your way to school; you can see it now through the window. But can other boys and girls, in other places, see the sky too? Can people a long way off see it?" "Yes; wherever we go, **we always have the sky over our heads.**"

"When you look up at the sky what shape does it seem to be everywhere?" "**Curve-shape.**"

"Which part of the curve seems to be the highest?" "**The part over our heads.**"

"Where does the curve seem to end?" "It seems to bend down **till it touches the earth** on all sides."

Show a large round basin (a glass one for preference). Stand it upside down on the table; and lead the children to compare the shape of the sky to the shape of the basin. It looks like a very, very large basin, placed upside down on the earth, just as this one is placed on the table. It covers the earth **like a great round roof all over.**

II. What the Sky is Like

"What colour do you say the sky is to-day?" "**Blue.**"

"Is it blue all over? I think I can see some parts of the sky, here and there, that are not blue. Look through the window, Harry, and tell me whether *you* can see any parts of the sky that are not blue."

Lead the child to describe to the rest **the small white clouds** *dotted over the sky here and there. They look like little heaps of snow, or white wool. Tell what they are. Sometimes, but not often, there is not one of these white clouds to be seen; the sky is blue all over. We then call it* **a cloudless sky.**

Lead the children to tell that they sometimes see no blue colour at all in the sky. It is of **a dull grey colour** *all over. That is because the sky is* **covered with thick clouds.** *We then call it* **a cloudy sky.**

"Who can tell me what the sky looks like, when we are going to have rain?" "The sky looks **very black.**"

"Yes, the clouds are then heaped up very thick and close together."

III. What we see in the Sky

Call upon the class to tell what else they have seen in the sky besides clouds.

The Sun.—"It shines in the day-time only. At night, when it is not shining, everything is dark. What does the sun do for us then? **It gives us light.** How dark and cheerless everything would be without the sun.

"How do we feel when the sun shines upon us?" "We feel warm."

"The sun then **gives us warmth as well as light.** It is like a great round ball of fire in the sky. Without the sun's warmth we ourselves, and all animals and plants, would die. Sometimes the thick clouds shut out the sun, so that we cannot see it, nor feel its warmth."

The Moon.—"At night, when the sun is no longer shining, the moon comes out in the sky."

Lead the children to tell that it does not look like the sun—a great ball of fire. It is **white and silvery**. *We can look at the moon without blinking, but we cannot look at the bright sun.*

Endeavour to make them talk of the changing shape of the moon, and explain and illustrate on the black-board, **new moon, half-moon,** *and* **full-moon.**

The stars.—*Let them next tell of the stars, and when they are to be seen.*

"How many stars are there?" There are so many that **we could not count them.** They help the moon to give us light at night, when the sun is not shining on us. They are dotted all over the sky. They twinkle all night long. Sometimes **the clouds shut out the moon and stars,** and the night is then very dark.

IV. WHAT COMES FROM THE SKY

Remind the children, before closing, that the clouds, although they sometimes shut out the sun, moon, and stars, are very good *to us. They send us* **the beautiful rain** *to make our plants grow. In the cold weather they send us* **snow** *instead of rain.*

Lesson XV

THE SUN

I. Introduction

Refer the children to their last lesson, and lead them to tell all they can of the sun, as to its appearance in the sky, and what it does for us. It is like a great round ball of fire in the sky, it gives us light and warmth. We feel the warmth of the sun when it shines on us.

"How long does the sun shine on us?" "It shines on us all day. It begins to shine in the morning, and it goes away in the evening."

"How do you know it is the sun that gives us light?" "Because in the evening **it grows dark,** when the sun is not shining; and the next morning **it gets light again,** as soon as the sun begins to shine."

"Can we see the sun in the sky every day, and all day long?" "No; we sometimes cannot see the sun at all."

"Why is that?" "Because there are thick clouds in the sky, and **they hide the sun from us.**"

"But are you sure the sun is always in the sky in the day time—say, on a very cloudy day?" "Yes; because if the sun was not shining, **it would be as dark as it is in the night.**"

"Quite right. The sun is shining if the day is ever so cloudy. The thick clouds hide the sun from us; but **they cannot shut out all its light.** Some of the sun's light passes through the clouds, just as it would through our window blinds, if we pulled them down."

II. WHAT THE SUN IS LIKE

"The sun, you say, is like a great round ball of fire. On a bright day we cannot look at the sun. It hurts our eyes, so that we cannot see well afterwards. We say that things **dazzle our eyes,** when they are so bright that we cannot look at them, without making our eyes ache.

"Can you tell me whether the sun is always the same colour?" "It is not always the same colour. All day long, if the sky is clear, **the sun is bright yellow,** like gold. In the evening, just before it leaves us, **it is red, like fire.**"

Remind the children of the beautiful red clouds, which are often seen in the sky in the evening. The clouds are sometimes so red, that they **almost look as if they were on fire.**

"What is it that makes the clouds look red at such times?" "It is **the sun shining through the clouds.**"

"What, do you say, sometimes shuts the sun away from us in the day-time?" "The thick clouds."

"Then which must be nearest to us, the clouds or the sun?" "**The clouds are nearest.**"

III. THE SUN RISES AND SETS

"Can you tell me in what part of the sky the sun was, when you went home from school at dinner-time?" "It was high up in the sky."

"Did you see it in the same part of the sky when you came to school in the morning?" "No."

"You are quite right. It was not there, and it is not there now, for the sun is not always in the same part of the sky.

"The sun begins to shine in the early morning in one part of the sky, **which we call the East.** We say **the sun rises in the East.** It shines upon us all day, and in the evening it passes away from us in another part of the sky, **which we call the West.** We say the sun **sets in the West.**

"In the middle of the day **it is very high in the sky**. We call this part of the day, **noon.**"

IV. WHAT THE SUN DOES FOR US

Let the children tell again that the sun gives us light and heat. Lead them to think of the long, bright days of summer, when the sun is shining down upon us most of the time; and then of the short dull winter days, when we often do not see the sun at all. The summer is the time when our **plants grow,** *our* **beautiful flowers burst open,** *and* **the fruits ripen.** *It is the sun that does it all.*

Lesson XVI

CLOUDS AND RAIN

I. INTRODUCTION

This lesson, from its very nature, like others of its kind, would have more interest for the children if a suitable day were selected for it, because then they would have actually before their eyes all the phenomena with which it deals.

With the rain falling fast outside, then, the teacher would naturally commence by making some remark about the wet day. Boys and girls do not like wet days. They cannot play outside, but must remain in the house. Mother sends them to school with strong boots, thick coats, and umbrellas, so that they may not get wet. But the rain is very useful to us in many ways. Suppose we try and learn something about it to-day.

II. THE CLOUDS

"Where is the rain coming from?" "**From the clouds.**"

"Where are the clouds?" "The clouds are **in the sky.**"

"What colour is the sky to-day?" "It is **a dull grey** colour."

"Is it always this colour?" "No; it is sometimes **a beautiful blue** colour."

"What do we then say about the sky?" "We say it is **a cloudless sky.**"

"Why is it dull and dark now?" "Because it is **covered with clouds.**"

Lead the children to tell that the clouds are **heaped up so thick and close** *together to-day, that we cannot see the sun's bright light through them, nor feel any of its warmth. The clouds shut it away from us altogether. But the clouds are not always the same as we see them to-day. It is only on a rainy day that they cover the sky as they do now. Let the children tell of the little white patches of cloud, which are almost always dotted over the blue sky on a clear, bright day, and look like* **heaps of loose white wool.** *Tell that sometimes we see* **a great black cloud,** *as black as ink, come up and spread itself out, till it covers the whole sky. Then all of a sudden there comes* **very heavy rain,** *and perhaps* **lightning and thunder** *with it. Remind them that the rain from these grey clouds, which they can see in the sky now, has been falling all day long. The rain from those inky black clouds, although very heavy, is soon over. We call it* **a storm.**

III. What the Clouds are made of

"Now I daresay you would like to know what the clouds are made of. I will make a little cloud for you, and then you will be able to see for yourselves what a cloud is like, and what it is made of."

The kettle, which to save time has been simmering all this while somewhere out of sight, should now be brought forward and made to boil over the spirit-lamp.

Call attention to something new coming out of the spout. What is it called? What colour is it? What is there inside the kettle? Where did this steam come from then?

"The steam, which you see coming out of the spout, is made from the water in the kettle. **It is a little cloud.**

"What has changed the water into this little cloud of steam?" "The **heat** of the flame."

"How long will the steam rush out of the spout in a cloud like this?" "Till all the water in the kettle has boiled away."

"Now I want you to notice what happens when I hold this wet slate in front of the fire. You see there is **another little cloud rising from the slate,** just like the steam which is coming out of the spout of the kettle.

"What is causing this?" "The **heat of the fire** is changing the water on the slate into a cloud."

"How long will this go on?" "Till the slate is quite dry."

"Do you know what would happen, if I stood the wet slate out in the hot sun?" "The slate would soon get dry."

"Why would it get dry?" "Because **the water on it would be changed,** as the water on this one was, and fly away in **a cloud.**"

"What would change it?" "The **heat of the sun.**"

"Yes, heat always changes water into the form of cloud in this way."

Tell of the sun's great heat, and its action on water everywhere. It acts just as it would on the wet slate. This is how all the clouds in the sky are formed.

"I am now going to take another slate and hold it over the steam as it comes from the spout. **The steam,** you see, **turns into water again,** as soon as it touches the cold slate. Look at the water trickling down the slate. **Steam is really water.**

"Now try and answer me two questions.

"What was it that changed the water in the kettle into a cloud of steam?" "**The heat** of the flame."

"What changed the steam back into water?" "**The cold** slate."

Lead the children to think about the steam in the wash-house *on washing day. They cannot see across the place. Compare this to a* **fog.**

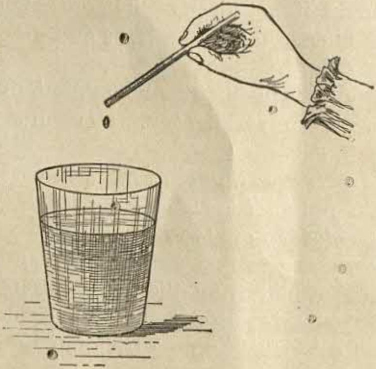
Lead them on from the **fog** *to the* **cloud.** *The steam in the wash-house is a sort of fog.* **The fog is exactly like a cloud.**

"When the steam touched the cold slate, what happened?" "It changed into water, and the water ran down the slate."

"It is just so with the cloud. When the cloud gets cold, it changes into water again, and then **that water falls down to the earth in drops of rain.**"

IV. The Rain

Call upon the class to describe, in their own way, how the rain falls. It does not fall down in a stream, as they have seen water come out of a spout or a tap. It always falls in little drops.



Dip a stick into a tumbler of water, and hold it up for the children to see the drop of water hanging at the end of it. Shake the stick, and lead them to describe the shape of the drop of water that falls from it. It is ball-shape. It is a little round ball of water. The rain always falls in little round balls of water like this. We call them rain-drops.

Lesson XVII

THE WIND

I. Introduction

Selecting, in this case again, if possible, a suitable day for the lesson, the teacher would begin with some remarks about the weather. The wind roaring outside, or whistling down the chimney, or swaying the branches of the trees to and fro, would naturally serve as a pretext for calling attention to what was going on.

"What is the meaning of all this noise?" or "Why are the trees bending over from side to side like this?" The wind is doing it all. Let us see what we can learn about the wind.

II. What it is

"Look how the blind is flapping about at the open window. Is the wind doing that, too?" "Yes."

"But where is the wind? I cannot see it. I can see the blind moving about, but I cannot see the thing that is moving it. Can you see it?" "No; **we cannot see the wind itself**; but we can see the things sway about, as the wind pushes up against them."

"What do we say the wind does to the things?" "It blows them about."

Lead the children to tell how the wind blows their clothes about, and snatches their hats and caps off their heads, as they run to school. They cannot see anything near them, but all in a moment their hats are blown across the road, and they have to run after them to get them again. **We cannot see the wind.**

Let them tell, further, that although they cannot see the wind, they can feel it blowing in their faces, and all round them. It sometimes blows so hard against them that it makes them run; and it sometimes knocks them down. **We can feel the wind, although we cannot see it.**

"But in this warm schoolroom, and in our beds at home, we cannot even feel the wind, and yet we know it is blowing. How is this?" "**We can hear it.**"

Yes, we can hear it. Tell how the wind roars and howls round the house at night; how it rustles among the leaves and branches of the trees; how it whistles through the key-holes of the doors, and down the chimneys. We hear all this. Our ears tell us what our eyes cannot tell us. **We can hear the wind, and we can feel it, but we cannot see it.'**

"What can this wind be, which we hear and feel, and yet cannot see?"

Bring a child to the front, and set him to wave his hand to and fro quickly. Ask him whether he feels anything, as he moves his hand about.

Tell of the air all round us. We cannot see it; we cannot hear it; we cannot even feel it till we wave our hands about through it. But it is always here. **There is air everywhere we go. We could not live without the air—no animal could live without air.**

Let the children stand up and take a deep breath. **They can feel the air,** *as it rushes in at their mouth and nostrils, and out again, every time they breathe.*

"The air in this room is still. We do not seem to know it is in the room as we sit here. The air outside is not still. It is rushing along. **When the air moves about in that way we call it wind.** We say the wind blows; and it is really the air moving about."

III. WHAT IT DOES

(1) **It brings the rain.**—*Lead the children to think of the clouds in the sky. They are not all the same shape and size; they are always changing. Sometimes they are in little patches, sometimes they are in great masses like hills. They do not always remain in the same part of the sky. They move about; and it is the wind that blows them about in the sky. We may sometimes see the clouds driving onwards so quickly, that they almost look as if they were chasing one another through the sky.*

Then we see one cloud break into another, and change its shape, as they drive on together. Sometimes they move slowly, and sometimes they scarcely seem to move at all.

"The wind does all this. **It drives the clouds** from one part of the sky to another. The rain does not all fall in one place."

(2) **It dries the ground after the rain.**—*Picture a shower of rain. The warm sun shines out and dries the ground, as we saw the wet slate dried, when I held it in front of the fire.*

"What becomes of the water, as the ground dries up? The heat of the sun changes it, as we saw the heat of the fire change the water on the slate. The wind blows it away, and it rises up to the sky as a new little cloud."

LESSONS ON COMMON OBJECTS

Lesson XVIII

A BRICK

I. What our Eyes tell us

Show the common red building brick which was used in one of the earlier lessons. Remind the children of their old lesson, and at once lead them to tell all they know of the shape of the brick as follows:—

"I want you to look at the brick and tell me what we say about its shape." "We say it is **brick-shape.**"

"In our lesson I showed you something nearly the same shape as the brick, but not quite. What was it?" "**A cube.**"

"How many sides or faces has the brick?" "**Six faces.**"

"Here is a cube. How many faces has it?" "**Six faces.**"

"What is the shape of each face of the cube?" "Each face of the cube is **a square.**"

"What is the shape of each face of the brick?" "Each face of the brick is **an oblong**."

"Look again at the cube. What do you know about the size of its six faces?" "They are all **the same size**."

"Now look at the brick. Are all the faces of the brick the same size?" "No."

"How many faces of the brick are the same size?" "The top is the same size as the bottom; the two sides are the same size, and the two ends are the same size."

"Come and point out the top and bottom of this brick, Fred—now the sides—now the ends.

"Which faces of the brick are the largest?" "**The top and bottom.**"

"As each face of the brick is oblong in shape, what can you say about all its corners?" "They are all **right angles**, or square corners."

"Harry shall take the chalk now, and draw on the black-board the shape of one of the sides of the brick. What is the shape of the figure you have drawn, Harry?" "An **oblong**."

"Now that you have told me all I want to know about the shape of the brick, I want you to tell me what else we can learn by looking at it." "We can learn **the colour** of the brick."

"What colour is it?" "It is **red**."

Lead the class to tell that all the bricks they have seen are not red like this one. Show a new yellow brick, and let them tell its colour.

II. What our Hands tell us

"We can't learn any more by looking at the brick. Willie shall come to the front and take it in his hands. Perhaps he will then be able to tell us something more about it.

"Now, Willie, suppose you rub your finger over the brick.

"What can you tell us about it?" "It feels **rough**."

"Yes, the brick has **a rough surface.** You find that out **by feeling it.**

"Now squeeze it in both hands. Have you found out anything else?" "It is **hard.**"

"Yes, it is hard; but you could not have told that by looking at it.

"Now I want you to hold it in your hand, and stretch out your arm as far as you can. What is the matter?" "**It feels heavy.**"

"What would happen to it, if I put it into a pail of water?" "It would **sink to the bottom.**"

"Would a wooden brick, as big as that, sink to the bottom of the water?" "No, it would **swim on the top.**"

"Why does the brick sink and the wood swim on the top?" "Because the **brick is heavy** and **the wood is light.** All heavy things sink, and all light things swim in the water."

III. What Bricks are used for

Lead the children to tell of the uses of bricks in building. Some of them have probably seen men building walls with bricks. Call attention to the kindergarten bricks on the table, and let one of the children come to the front, and show how the bricks are laid to make a wall.

Touch his wall when it is built up, and knock it over; and so lead the children to tell that the men use mortar to make their bricks hold together. The bricks and mortar make a strong wall, which cannot be easily knocked down, but will stand for a long time. Tell them that, in the next lesson, they shall learn something about the stuff of which this brick is made.

Lesson XIX

A PIECE OF CLAY

Commence by leading the class to tell all they can about bricks, and the purposes for which they are used. Remind them of the promise given at the close of the last lesson.

"We are now going to have a chat about the stuff of which bricks are made. Do you know what this is?" "It is a lump of clay."

"Let us try and find out all we can about this clay; for clay is the very stuff I meant. **We use clay to make our bricks.**

"Fred shall come to the front to help me, and you must watch what he does, for I shall want you to tell me all about it.

"Now, Fred, take the piece of clay in your hand and see what you can find out about it.

"What is the first thing you find out?" "It is **heavy**."

"Yes, it is heavy. See, I will drop this other piece into the basin of water. Where is it now?" "**At the bottom** of the water."

"What does this tell us?" "It tells us that **clay is heavy**."

"Now rub your hand over your piece of clay.

"What have you to say about it?" "It feels **smooth and moist** when I touch it."

"Squeeze the clay in your two hands, Fred. What does this tell you?" "It tells me that the **clay is soft.** I could not squeeze a stone like that."

"Do you remember any other way of finding out whether a thing is soft or hard?" "We can find out **by cutting it**."

"Then take this knife and cut me off a piece of it. Thank you.

"Do you still say that the clay is soft?" "Yes, it is soft, **because I can cut it easily**."

Illustrate further the softness of the clay by kneading, rolling, folding, and twisting the lump on the board. Then call upon two other children to come to the front, and instruct the first one to give to each of these a piece of the clay. He has no knife. That has been taken away. Call upon the class to watch what he does.

"How did Fred make three pieces of clay out of that one piece? He had no knife. He could not cut the clay."

"He **broke it up** into three pieces with his fingers."

"Yes, he did, and it broke easily. I want you now to try and remember a new word. We say that **clay is brittle, because it breaks easily.**

"Can you think of anything else that breaks easily?"

"Glass."

"Yes; glass breaks easily too. It is brittle. But glass is **hard and brittle**; our piece of clay is **soft and brittle.**"

Lead the children to mention a few common things, which are soft and brittle like clay, such as the crumb of bread, cake, chalk, etc., and others which are hard and brittle like glass, such as a slate pencil, a biscuit, a crust of bread, loaf-sugar, salt, and so on.

"Take this piece of wood, Fred, and break that up in your fingers. You cannot do it. The wood will not easily break. It is **not brittle.** We say it is **tough, because it will not easily break.**"

Instruct the three boys now to take their pieces of clay, and knead them up on the board, as the teacher has already done. Let one of them work his piece up into a ball; let another make a cube of his piece; and set the third to make his into the form of a brick. This, without any mention of the property of plasticity, will clearly show the ease with which clay can be worked into any required shape; and thus prepare the children for a future lesson on the subject.

The dried, brick-shaped piece of clay may now be introduced, and the children led to compare this with the one which Fred has just made.

Lastly, pass on to consider whence the clay is obtained. It comes out of the ground; so does a carrot.

Let the children tell that the carrot grows in the ground—it is a plant.

Plants have a root, stem, leaves, and flowers. **Clay does not grow in the ground**—*it has neither a root, a stem, leaves, nor flowers. It is* **not a plant.** *We dig lumps of clay out of the ground, as we dig stones.*

If time permit, the teacher should give a description in brief *outline of the process of brick-making, so far as the moulding, drying, and burning of the bricks are concerned.*

A picture of the brickfield might also be shown.

Lesson XX

WATER

I. Introduction

Introduce by reminding the children of their lesson on clouds and rain. Let them tell that the clouds are formed from **water**, *and that the rain which comes from them is* **water.** *Picture a shower of rain, and lead them to tell that the rain always falls in the form of little* **round balls of water,** *which we call* **rain-drops.**

"I want you to try and learn all you can about these rain-drops and what becomes of them. Remember that **all**

the water we use, for drinking, and for washing ourselves, our houses, and our clothes, once fell to the ground as **drops of rain.**"

II. Simple Properties of Water

Dip a small brush into a basin of water, and shake it over a tray placed in a slanting position on the table. Call attention to the **drops of water** *which fall from the brush. These are like* **the rain-drops.**

Notice what becomes of the drops as they fall on the tray. They trickle in little streams **down the slope of the tray,** *and collect in* **a pool at the bottom,** *or lowest part of it.*

Slant the basin over the tray, and show that the **water pours out** *and falls on the tray. What becomes of it then? It* **runs down** *to the lowest part of the tray just as the drops did.*

"Now let us think of what we have done. We first broke up the water into **little round drops,** by shaking them from the brush. Then we saw the drops **run together down the tray to the lowest part of it.** There the water lies now in **a little pool.** We saw, too, that **water can be poured out.** When we poured it on the tray it ran down, as the drops from the brush did. I want you to remember that **none of the water ran up the tray.**"

III. What becomes of the Rain-Drops

"Let us next think of the rain-drops. They come pattering down on the ground, but they do not lie there. They run together into little streams, and the streams run along the ground. We say **they flow** along the ground.

"Now think of the drops on the tray. Which way did they flow?" "They **flowed down** to the lowest part of the tray."

"Yes; water always **flows down,** just as you saw it flow down the tray. The rain flows down the street **to the lowest place** it can find, and there it stands in **a little puddle.**

"But we must not forget that some of the rain falls on the roof of our school. Hold up these two slates, Fred, and show me the shape of the roof.

"What could you say about each side?" "It is **slanting.**"

"Now think of the rain that falls on this slanting roof then. Will it stand there?" "No; it cannot stand on the slanting roof; **water always flows.**"

"Which way must it flow?" "It must **flow down** to the lowest part. It **cannot flow up.**"

"Quite right. The rain flows **down the slanting roof, down the gutters, down the pipes,** and then **down the drains.**

"But some of the rain falls on our fields and gardens. What becomes of that?" "It does not flow away, because the ground is soft. It **soaks into the ground,** and keeps our trees, grass, and other plants alive."

Lead the children to talk about the roots, and the work they do for the plant.

"With the help of the rain then, the plant gets the food it wants out of the soil. The rain soaks down into the soil all round the roots, and **the roots drink it in** to feed the plant.

"What would happen to the plants if the roots could not get water?" "They would soon die."

Call attention to the appearance of the grass in the hot summer weather, when there has been no rain for a long time. Instead of being fresh and green and healthy, it looks brown and dead.

"Now I want you to think of some of the rain that falls on the hills. Which way would it flow?" "It must **flow down the hill-sides,** for water cannot flow up-hill."

Tell as briefly and simply as possible that this water does flow down the hill-sides in little streams, just as they have sometimes seen the rain flow **down the streets**—*that the streams* *run one into the other and form rivers. It is the water of these rivers that we use for* **drinking and washing.**

"How do we get the water we want for our use?"

"We draw it from the tap."

"How does the water get there?" "It **flows along pipes** to our houses."

The children have probably seen men laying down the pipes, or opening up the ground to repair them. Let them tell all about it.

Lesson XXI

A FIRE

I. INTRODUCTION

COMMENCE by leading the children to talk about the sun. It gives us **light** *and* **heat.** *But the sun is not always shining on us; at night, when the sun has left us, it gets dark and cold. We do not then see the sun shining in at our windows, and making our rooms light. We cannot sit in the dark all night. What do we do? We light the* **lamp,** *or* **the gas,** *or* **a candle,** *and that gives us* **light** *in the room, so that we can see to work and read. But does the lamp or the candle warm us as well as light up the room? How do we make our room warm? We light a fire.* **That warms the room.**

II. WHAT OUR FIRES ARE MADE OF

"I want to see what we can learn to-day about our fires. The first thing will be to find out what the fire is made of. Can you tell me?" "It is made of **coal.**"

"Why do we use coal and not some of these stones to make our fires? Let me show you."

Hold a piece of coal in the flame of the spirit-lamp with a small pair of tongs, till it bursts into flame. Try the same thing with a stone. Call upon the class to note the difference—**the coal burns; the stone will not burn.** *Show them in the* *same practical way some other things that will not burn, such as pieces of brick, clay, or chalk. We could not make a fire with these. But* **wood** *and* **coke** *burn in the flame. The* **coke gets red-hot,** *but does not blaze. The* **wood blazes up,** *and burns away very quickly. Call attention to the fact that these things which burn, always keep on burning till they burn away altogether.*

"What other things besides coal, then, would make fire?" "Wood and coke."

"Why?" "Because they will **burn easily.**"

"Suppose we have a chat, now, about making the fire. Where do we make it?" "In the **fire-place.**"

"Do you know what we call the place in which the fire burns? I will tell you. We call it the **fire-grate.** It is made of **bars of iron.** There are bars across the bottom, and bars in front of the grate. We can see the fire behind the iron bars, and we can feel its warmth through them; but they keep the pieces of coal from falling out.

"Why don't we have wooden bars in the grate?" "The wood would catch fire and burn."

"Then, I suppose, iron is like brick, clay, chalk, and stone; **it will not burn.** You will also see now why the back of the fire-place is made of brick. **The brick will not burn away.**

"But the coal and other things, of which we make the fire, burn away in the grate."

Let the children next talk about the chimney and its use. Why have a chimney at all? Lead them to think of that very windy day, when the smoke would not go up the chimney, but came puffing out into the room, till the room was full of smoke. It made them cough; it made their eyes smart; it made everything black with the soot.

"When the smoke goes up the chimney in the proper way, none of this happens. But what becomes of the smoke? Does it stop in the chimney?" "Some of it settles in the chimney **as soot,** and the chimney-sweep has to sweep it down. But most of it goes away."

"How do you know it goes away?" "We **can often see it** pouring out at the top."

"Do you know anything else, besides smoke, that comes from the fire?" "**Ashes** and **cinders.**"

"Yes. I have some ashes and cinders on the table. Come here and point them out, Mary.

"Do the ashes and cinders go up the chimney too, like the smoke?" "No; **they fall through the bars.**"

"Where do they fall?" "They fall **on the hearth.**"

"What is the hearth made of?" "It is **made of stone.**"

"Why is it not made of wood like the floor?" "Because the hot cinders would make it burn."

"What does mother do with the ashes and cinders?" "She sifts them."

"Why does she do that?" "She **wants the cinders to make another fire.** They are not all burned away. The ashes are no more use. They will not burn any more."

Produce a common cinder-sifter, and show how to sift the cinders.

Lesson XXII

HOW TO MAKE A FIRE

I. Introduction

Commence with a brief resumé of the last lesson. Lead the children to tell all they can of the kind of materials, which we use for making our fires, and of the fire-place in which it burns. Be careful to insist on the importance of sifting the cinders and ashes. The ashes are no more use in the house. They are put into the dust-bin, and the dust-man comes and takes them away in his cart.

Tell that these ashes are taken away to the brick-makers. They mix them with the clay to make bricks.

*But we are now going to see why the cinders should not *be thrown away. They are pieces of coal that are not burned up. We can use them again.*

II. HOW TO MAKE A FIRE

"Now suppose we see how the fire is made."

The teacher herself should practically show each step of the process.

"The first thing to do is to see that the iron bars at the bottom of the grate are quite clear. I must tell you why. You know that all round us, everywhere, there is something which we can neither **see** nor **feel**, although **we could not live without it.** What is it called?"
"**Air.**"

"Quite right; and you must remember now that **the fire wants air**, too. **It would not burn without air.** We keep the bars clear, so that the air may get in to the fire, and help it to burn.

"What shall we use to clear the cinders out from between the bars?"

Call attention to the poker. Let the children tell that, like the grate itself, it is made of iron,—and why. Show how to remove the cinders at the bottom by raking with the poker between the bars.

"Mother sifts her cinders. I will now show you what she does with them."

Take some of the cinders lying on the table, and place them loosely at the bottom of the grate. Explain that these cinders will easily catch fire and burn again. It is wrong to throw them away, and waste them.

"Now I have here some coal, wood, shavings, and paper. I wonder which of them I must put in the grate first. We will soon see."

Take the materials, one by one, and hold them with the tongs in the flame of the spirit-lamp, calling upon the children to notice what takes place. The paper blazes up in an instant and makes a great flame, and the shavings burn almost as readily as the paper. The pieces of wood burn too, but they do not take *fire so quickly as the other things. The coal takes longer than any of them to burst into flame.*

"Now I think you can tell me which I must put in the grate first." "The paper and shavings."

"Why?" "Because **they light very quickly,** and will blaze up and set the other things on fire."

"Quite right. Then I will put the paper and shavings in. But you must not forget the air that the fire wants. I don't lay the paper flat on the cinders, but I crumple it up loosely, **so that the air may get in** between. What shall I put on next?" "The wood."

"Why?" "Because **the wood will catch fire more quickly than the coal.**"

"I want you to see, too, how I lay the wood. I don't throw it on the paper in a heap, but I **lay the sticks loosely across** between the bars. Can you tell me why?" "**To let the air** get in."

"Quite right. And now there is nothing more to do but to put the coal on the top.

"This is a great lump of coal. Shall I put it on as it is?" "No."

"Why not?" "**The air could not get inside it** and help it to burn."

"What shall I do then?" "Break it up."

"How shall I break it?" "Strike it with the hammer."

Break the piece of coal with the hammer, and lead the children to tell that because it breaks easily, when it is struck; **it is brittle.** *Lead them to tell that the coal is* **hard** *although it is* **brittle.** *Some things, such as moist clay, the crumb of the loaf, and a piece of cake, are* **soft** *and* **brittle.**

Take one of the pieces up, and show that it has **made the fingers black.** *Would this piece of brick or stone leave a mark? What kind of mark does a piece of chalk leave if I pick it up?*

"I could not keep my hands clean if I put the coal on with my fingers, so I will put it on with these things. What do we call them?" "Tongs."

Let the children describe them and tell their use.

"Now our fire is laid. Nothing more is wanted but to put a match to it, and it will burn up in a few minutes."

While it is burning, a word or two might be said about the coal—what it is, and where it comes from. It is dug out of the ground like clay, stones, and sand. **It does not grow in the ground. It is not a plant.**

Close the lesson by eliciting from the class some of the uses of fire. It warms us and our houses, it cooks our food, it boils our water, it dries our clothes. We have to be very careful not to get too close to the fire, or our clothes would easily catch light, and we should quickly be burned to death. **Children must never play with the fire.** *Many a poor little child has been burned to a cinder through being silly and disobedient.*

Lesson XXIII

A CUP AND SAUCER

I. Introduction

Show the cup and saucer, and let the children tell what they are used for. "*What other things do we see on the breakfast and tea-table besides cups and saucers?*" "*Plates.*"

Do we put our tea and coffee into the plates, as well as into the cups and saucers?

What use do we make of the plates?

Let us try and find out why we use these things so.

Place a piece of bread on a plate, and set one of the children to carry it across the room. Now remove the bread, fill the plate with water, and let him try to carry it again. Show that he cannot carry it this time without spilling the water on the floor. Now turn the water out of the plate into a tumbler. He has no difficulty in carrying the tumbler. He does not spill the water. Let us see what all this means.

II. USES OF THE CUP AND SAUCER

"We are going, first of all, to think about our lesson on water.

"What can we do with water, that we cannot do with this piece of bread?" "We can **pour the water out,** but we cannot pour out the bread."

"Quite right. You saw me pour the water out of the plate, just now, into the tumbler. Now I will pour it out of the tumbler into this jug.

"Let us put the bread on the plate again, and I will see if I can pour the bread out, as I did the water. No, I cannot. I can slant the plate, and the bread will not pour out; but if I put water into it, and move it only a little, I spill some of the water.

"Why is this?" "Because **water always flows about.**"

"Look, I will place the bread on this broken plate, and it stands as well as it did on the other. But if I pour water into it, the water flows out at the broken part, and falls on the floor. There is nothing there to keep the water in.

"The piece of bread, you see, stands by itself in the middle of the plate. Now look carefully, while I pour some water slowly into the plate. Where is the water? It does not stand up as the bread did, in the middle of the plate. **It flows down and fills the lowest part of it.** It would run out, but the sides of the plate keep it in. The water **spreads out on all sides,** and the top of it is quite flat. **It cannot stand in a heap** in the middle of the plate as the bread does.

"Now perhaps you can tell me why I can pour more water into the saucer than into the plate?" "**The sides of the saucer are higher** than the sides of the plate, and hold the water in."

"Quite right; and that is the very reason why Fred was able to carry the water in the tumbler without spilling it. The sides of the tumbler **made a sort of wall** all round the water, and held it in. All the things we use for holding water must have sides to keep the water in, or it will flow away.

"Now think of the tea and coffee we have at our meals. What are they made of?" "Water."

"Can we pour them out, as we pour water?" "Yes."

"Do they flow about as water flows?" "Yes."

"When mother pours a little tea into the cup, where do you find it?" "**At the bottom of the cup.** It flows down and fills the lowest part of the cup first."

"What keeps it from running out?" "**The sides of the cup.**"

"What would happen if she put too much in?" "It would flow over the top."

"Now I think you can see why we use cups and saucers for our tea and coffee, and plates for our bread, and meat, and cheese."

III. What they are like

"Now let us look at the cup and saucer, and see what else we can learn about them."

Place each article against the black-board, and trace its shape with the chalk. Let the children tell the shape of the figure on the board. It is a circle.

"What is the shape of the cup and saucer then?" "**Round** or **circle shape.**"

"What colour are they?" "**White.**"

"What colour are the pretty flowers on the cup?" "Blue or green as the case may be."

Let the children take the articles in their hands, and tell that they feel **hard** *and* **smooth.**

"What would happen, if you dropped them on the floor?" "They would break."

"What does that tell us?" "It tells us that they are **brittle** as well as hard."

"Do you know what the cup and saucer are made of?"

Tell that they are **made of clay.** *Elicit from the class that* **bricks** *are also* **made of clay.** *Explain that cups and saucers are made of finer, better clay than that of which bricks are made.*

Show a **flower-pot.** *This, too, is* **made of clay.** *It feels* **rough**; *but the cup and saucer are smooth. The cup and saucer were* **rough too like the flower-pot,** *at first. They were afterwards made smooth and shiny like this.*

LESSONS ABOUT MYSELF

Lesson XXIV

THE EYES

I. INTRODUCTION

INTRODUCE the new subject by leading the children to think about the many useful lessons they have had. These lessons have taught them a great deal about all sorts of things around them. But they have done more than this. They have shown them how they can be always learning more and more, if they only try.

Lead them to tell that many of the things they have learned they have found out by using their eyes.

We are now going to see what we can learn about these useful eyes themselves.

Bring a child to the front and proceed as follows:—

II. WHAT THE EYE IS LIKE

Call attention to the child's eye. Tell that although we cannot see all of it, it is really a round ball. We call it the **eye-ball.** *It would add very much to the interest of the* *lesson, if a bullock's eye could be provided for the inspection of the children. Nothing more need be done with it than to pass it round on a plate, so that the children might examine it for themselves.*

"Now let us see what we can learn about the eye-ball itself. If you look at it you will see that the largest part of the ball is all one colour. What colour is it?" "**White.**"

"Quite right. We call this the **white of the eye.** Come and point out the white part of Harry's eye.

"Now look at the front part of the ball. Is that white, too, like the rest?" "No."

"Look at Harry's eye again. What colour is that?" "**Blue.**"

"Come here, Mary. What colour are Mary's eyes?" "**Black.**"

"Now Fred shall come. What is the colour of his eyes?" "**Brown.**"

"What is the shape of this coloured part of the eye?" "**Ring-shape.**"

"What is there in the middle of the ring?" "**A round black spot.**"

"This round black spot in the middle of the eye is called **the pupil.** It is really a **little round window** in front of the ball. **We see with the pupil of the eye.**"

Tell that the ball itself is hollow. Compare it to an india-rubber ball with a hole in it. Show one if possible.

"The coloured part, which forms a ring all round the pupil, is a **little curtain.** We call it **the iris.** This curtain can open wider, or draw itself closer over the pupil; so that the pupil is not always the same size.

"When the light is very bright, **the curtain closes up,** and the pupil is made small, so that too much light may not get in at the window. When the light is dull, **the curtain draws back** to let in as much as it can."

This is just what mother does with the curtains in front of the window at home. Explain.

III. How the Eye is taken care of

1. **The Socket.**—"Each eye is placed in a little **round room** of its own, which is called **the socket.** The walls of the room **are made of bone.**"

Point this out in the child's eye. Show how these bony walls stand out beyond the eye itself all round, and take care of it—the broad overhanging bone of the brows above, the nose-bones in the middle, between the two eyes, and the cheek-bones below.

"These little rooms are thickly lined with **soft fat,** so that the eye-balls may not be hurt as they move about."

Show how the eyes do move about—up and down, and from side to side.

2. **The Eye-lids.**—*Tell that we have not only curtains in front of the little windows, but we have* **outside shutters** *as well.*

"These shutters are **the eye-lids.** They can move up and down. When do we always shut the shutters?" "**When we go to sleep.**"

"What do we do when the dust is blowing?" "We **close the shutters** to keep out the dust."

Call attention to the fringe of little hairs along the edges of the eye-lids. "These are **the eye-lashes.** They help to keep out the dust from the eye, and to shade it when the light is too strong."

3. **The Tears.**—*Tell next of the tears. We see tears in the eyes when people cry. Tears also come into the eyes if they get hurt with a blow. The tears then run over the eye-lids.*

"The tears are meant **to keep the eye-ball moist,** so that it may move about easily in its socket."

4. **The Eye-brows.**—*Conclude by describing the* **arches of hair,** *which hang over the front of the socket. Compare them to the eaves of the house which hang over the walls, and keep the rain from running down them. The eye-brows* **keep the sweat from rolling off the forehead into the eyes.**

Lesson XXV

THE EARS

I. Introduction

Lead the children to think about their lesson on the eye.

"We called the eyes the **windows of the body.** Why?" "Because the light shines in through them, as it does through the windows of our houses."

"Can we see at night, or in a very dark room?" "No."

"Why not?" "**Because there is no light to shine into the eyes.**"

Remind the class that we learn many things by using our eyes, but our eyes cannot tell us everything. Let them think of the lesson on the wind. Our eyes cannot tell us anything about the wind, because we cannot see the wind.

"How do we know when the wind is blowing outside the house?" "We can **hear it.**"

"What do we hear?" "We hear **the sound** which the wind makes."

"How do we learn that?" "Our **ears** tell us."

"How many ears have we?" "Two; one on each side of the head."

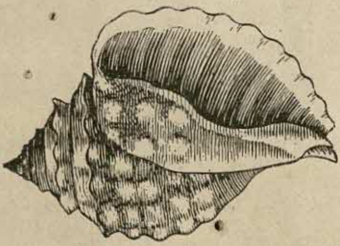
"We are going to try and learn something about our two ears to-day."

II. What the Ears are like

Bring one of the children to the front as usual, and call attention to the shape of his ear. Lead the class, step by step, to describe its general appearance, as far as they can, the teacher taking up the thread only where they fail.

"It is rounded, or **curved behind,** and hollowed out in the middle, something like **a wide, open shell.** It is very much like a shell in shape."

Show if possible a large univalve shell, or draw one on the black-board.



Let the children next feel their own ears, and tell that they feel **stiff and hard,** *and not like the soft flesh of their cheeks. Lead them to distinguish between this stiffness and the hardness of the bones in the other parts of the head and face.*

They can bend their ears as they please, but they will always **go back to the same shape again** *Bones are so hard that they will not bend at all."*

Tell that the ears are not made of bone, but **gristle.** *A piece of gristle might be obtained from the butcher's shop, so that the children could handle and examine it for themselves, side by side with some bones. They could easily be led to describe it.*

"Gristle is **tough, stiff,** and **strong,** but not hard like bone. It will **bend,** but will **not break,** and **it goes back to its proper shape again** after it is bent.

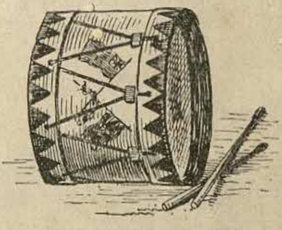
"The ears always keep their shape, spread out wide like a shell, because they are made of this stiff gristle."

Tell that if the ears were made of soft flesh, without any gristle, they would fall down and cover up the passage, so that the sound would not be able to get in.

III. The Inner Ear

Call attention now to the middle of the ear, and the tube or passage which can be seen opening into it. Tell that this little passage is about an inch long, and the end of it is closed up by a skin, which is stretched across from side to side.

Show a child's toy drum, with the parchment removed from one end. Compare it to the passage in the ear. This toy is *called a drum. We call the skin stretched across the end of the ear-passage* **the drum of the ear.**



Strike the parchment of the toy drum, and call upon the children to notice how the skin shakes when it is struck, and how the sound is sent back from the hollow inside of the drum. They can feel the vibrations, if they put their hand on the drumhead.

"Now let us think of the drum of our ear.

"I ring this bell. **The sound made by the bell strikes on the drum** at the end of this long passage and **makes it shake.** When the drum shakes, it carries the sound through into the inner ear, so that we can hear it."

IV. HOW THIS INNER EAR IS TAKEN CARE OF

Lead the children to think what a blessing **this sense of hearing** *is to us. Picture a deaf person, and tell what a great want he must feel, in not being able to hear as we do.*

Why should this drum and all the inner part of the ear be placed so far within the head? Why shut in with thick walls of bone? It is all to take care of it.

Tell that the drum may be easily hurt. If it is hurt, we lose our hearing and become deaf. Children should be warned not to push pencils or any other thing into their ears.

Tell of the wax in the ear-passage and its purpose—to keep insects from getting into the ear. But sometimes there is too much wax, and the passage becomes blocked up. This makes people deaf.

Lesson XXVI

THE NOSE

I. INTRODUCTION

PLACE on the table, in readiness for the lesson, two saucers—one filled with water, the other with paraffin oil.

Commence the lesson by calling attention to the saucers. Tell the children what they contain, and ask them to say which of the two is paraffin. They cannot do it; one looks so much like the other.

Bring one of the children to the front, and tell him to take both saucers in his hands and look closer. He will, probably to his own surprise and the surprise of the class, be able to point out the paraffin the moment he comes close to it.

When he has done so, lead him to tell how he found out what he wanted to know. Neither his eyes nor his ears could help him; he could not learn by feeling. He did learn, but in another way, **by smelling. His nose helped him.**

"The nose, you see, is very useful to us. Let us find out what we can learn about it."

II. WHAT THE NOSE IS LIKE

Call attention to the child's nose, and let the class describe, as far as they can, its position and shape. It begins just below the middle point of the forehead, and between the two eyes. It forms **a ridge** *down the middle of the face. It* **stands out** *from the rest of the face, and ends in a point which we call* **the tip of the nose.** *The* **two nostrils** *are placed side by side behind the tip of the nose. They are long, narrow holes or slits. These facts could be easily elicited by a few questions.*

"Now you yourselves have told me all you can by looking at Fred's nose, I will help you to find out something more.

"Feel your own noses, and you will find that one part is harder than the rest.

"Which is the hard part of your nose?" "The **top part**, between the eyes."

"What makes that part of the nose so hard?" "It is **made of hard bone.**"

Tell that we call this hard bony part, that springs from the bottom of the forehead, **the root of the nose.**

Now let them feel the lower part of the nose, nearer the tip, and tell that it is not hard like the upper part, nor is it soft like their cheeks. Let them bend it from side to side, and show that it always goes back to its proper shape again.

"Where have we found anything like this before?" "In the ear."

"What is the ear made of?" "**Gristle.**"

"Why is it made of gristle?" "To keep it **spread out**, so that the ear-passage **may not be closed up.**"

"Now look at the nostrils at the end of the nose. Perhaps you can tell me why this part of the nose is made of gristle?" "To keep the nostrils **from falling together** and closing up."

III. Breathing

"Let us see what we can find out about these nostrils, and then we shall learn why they must be kept open.

"Each nostril is **the opening of a passage**, which runs up through the nose. The two passages run side by side, with a wall of gristle between them. They bend backwards, and their other ends **open into the throat.**

"Now think what you are always doing with your nostrils?" "Breathing."

"What do we breathe?" "**We breathe air.**"

"Yes; and you can feel the air as it passes in and out of the nostrils.

"If you have watched a person sleeping, you know that he must breathe then, as well as when he is awake.

"Now tell me why the lower part of the nose is made of gristle?" "It is **to keep the nostrils open.** The stiff, tough gristle will not let them fall together and close up the passages."

"Why must the nostrils be kept open?" "We breathe through the nostrils; the air could not get in and out, if the nostrils were closed."

Call attention to the fact that air also goes in and out at the mouth. We breathe through the mouth as well as through the nostrils. Show that we may close the mouth altogether, and breathe easily through the nostrils only. But if we close the nostrils, we find it very hard to breathe through the mouth alone.

IV. Smelling

Lead the child lastly to think about dinner-time at home. As soon as they get into the house they know what they are going to have for dinner. How do they know? The air, which rushes up their nostrils as they breathe, carries the smell of the dinner with it. The eye could not find out this smell, the ear could not find it out. But the moment the air rushes up those air-passages of the nose, we find it out. We call this the sense of smell.

"This is just how Fred found out the paraffin in the saucer. Paraffin has a very strong smell; he smelt it as he breathed, and without trying to smell it."

"What do we do when we want to smell something?"

"We sniff up the air quickly through the nostrils."

Lesson XXVII

THE MOUTH

I. Introduction

Commence by leading the children to tell all they can about the mouth. It is placed not down the face, like the nose, but across the face. It lies between the nose and the chin. The *red lips form the opening to the mouth. There are two of them —an upper and lower one. We use the mouth for eating and drinking, and also for breathing, speaking, singing, laughing, crying, and so on. A few carefully chosen questions would elicit all this.*

II. The Teeth

Bring a child out to the front, and let him open his mouth. Call attention to the double row of white, shining teeth. "What use do we make of these?" "We use them to chew our food."

Tell the child to open and shut his mouth, and let the class notice carefully which row of teeth moves every time.

"The teeth are placed in the two jaws. Part of each tooth is fixed deep down in the jaw. We call this part **the root of the tooth.**"

Compare it with the root of the plant. It is deep in the jaw, so that we cannot see it. Show a tooth of some kind, and point out the root of it. It is not white and shining like the part that can be seen when we open our mouth.

"The upper jaw-bone is fixed firmly to the other bones of the face, and **cannot move.** The row of teeth round this jaw, then, **do not move** when the mouth opens and shuts.

"Now let us look at the lower jaw. Take your chin in your hand, Harry, while you open and shut your mouth. Does your chin move?" "Yes."

"This chin is the front part of the lower jaw. It is joined just in front of the ear to the other bones of the face. It is able **to move up and down,** as a box-lid moves on its hinges.

"Why should it move up and down at all?" "To bring the top and bottom row of teeth together when we are eating our food."

"What do the teeth do to the food?" "**The teeth chew the food.**"

Set the boy now to bite a piece out of an apple, or a slice of bread and butter. Let the class note the shape of the bite and *tell which teeth he uses. This will naturally lead to a simple classification of the teeth into* **cutting teeth** *and* **chewing teeth.** *Show again that the child bites off the piece with his* **front teeth**, *and chews it up with* **the back ones.**

Notice next the shape of the two kinds of teeth—the front ones **long and flat, with sharp cutting edges**—*the back ones large and broad,* **with square flat tops** *for grinding up the food.*

Point out the smooth flesh and skin which cover the jaws all round the roots of the teeth. These we call **the gums.**

III. THE TONGUE

Call attention to the tongue next. Lead the children to describe its shape—long, flat, and rounded, and rather pointed in front.

If they feel the tongue, they will find that it is not hard like bone, not stiff and tough like gristle, but **soft like their cheeks.**

"The tongue is made of flesh, and covered with skin. It is joined to the back part of the mouth, near the throat. We call this part **the root of the tongue.** The rest of the tongue is free to move about."

Lead the children to tell why the tongue is made to move. We move the tongue about when we speak. **We could not speak without a tongue.**

"Can you think of anything else we do with the tongue?" "**We taste things with the tongue.**"

"Yes; we can learn through the tongue what we cannot learn in any other way. The tongue will tell us in a moment whether a thing is **sweet, sour,** or **bitter**; whether it is **nice** or **nasty.** We could not learn this through our eyes, our ears, or even through our nose. We taste things with the tongue."

Remind the children in conclusion that we once learned to call the eyes **the windows of the body.** *We might also call the* **ears, nose,** *and* **mouth the doors of the body.** *Everything that goes in and out of our houses must go* *through the doors. It is just so with these doors of our body.* **Sounds go in at the ears,** *so that we may hear them.* **Smells go in at the nose,** *so that we may smell them.* **The food** *which we eat* **goes in at the mouth.** *Besides this, every time we breathe,* **air is going in** *and* **coming out through the mouth and nostrils.**

LESSONS ABOUT ANIMALS THAT WALK

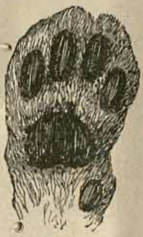
Lesson XXVIII

THE FEET OF ANIMALS

I. Paws and Claws

1. **The Cat's Paws.**—*Have living pets as far as possible to illustrate the lesson. This could certainly be done without much trouble.*

Begin by calling attention to the cat's feet. Like the rest of pussy's body, they are covered with soft, smooth fur. Notice the toes on each foot. Each **front foot** *has* **five toes**; *each* **hind** *one* **four.**



Raise one of the feet so that the under parts may be seen. Point out the **soft, smooth pads.** *Tell that there are seven pads on each of the front feet, and five on each hind foot. Pussy walks on these padded toes. They are so soft that* **she makes no noise as she walks along.**

"Pussy looks quiet and gentle enough now; but what does she do if unkind boys and girls tease her and make her angry?" "She scratches them **with her claws.**"

"Come and show me her claws, Mary. You cannot see them. She always keeps them **drawn back** and hidden away when she is not angry, but she can put them out in an instant when she pleases.

"You can feel the claws under the skin now she has them drawn back. They feel loose, and move about."

Show now a picture of the foot, either in a drawing prepared beforehand, or by a black-board sketch. Let the children point out the several parts. Tell that the claws are made of the same horny stuff as our nails are made of. They are **the cat's nails.**

"A foot like this one with claws on the toes is called **a paw.** Pussy's feet are **paws.** Her claws are **very sharp, strong,** and **curved like hooks.**"

Lead the children to tell that we keep pussy at home to catch rats and mice, because we do not like them to run over the food in our cupboards. Those sharp claws dig into their flesh and hold them fast.

2. **The Dog's Paws.**—*Call attention now to the feet of the dog. Let the children examine them, and tell what they find, point by point.*

"The dog, like the cat, has **five toes on each front foot,** and **four** on **each hind one.** We call the dog's foot **a paw.** The toes too are **padded,** for he **walks on his toes** just as the cat does."

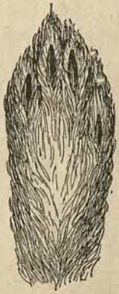
Put the dog on the floor, and let him run across the room. Remind the children that we cannot hear the cat as she treads on her soft, padded toes. But we can **hear the pattering of the dog's feet** *now every step he takes. Let us see why this is.*

Show the dog's foot once more. Call attention to the claws on the toes. Tell that he **cannot draw his claws back** *as the cat does. Although his toes are padded,* **the ends of the claws rub the ground** *at every step. This is why he makes a noise when he walks.*

Show a picture of the dog's paw.

"The dog's claws get rubbed away on the ground as he walks. They are never sharp like the cat's claws, but

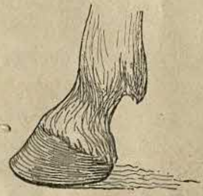
always blunt. Dogs are very fond of burying bones in the ground, and hiding them away there till they want them. They use their strong, blunt claws **for digging** and **scratching in the ground.** When a dog catches a rat, he does not seize it with his claws as a cat would, but **in his mouth.** He does not want sharp claws."



3. **The Rabbit's Paws.**—*Introduce the rabbit next. Call attention to its feet.* **Each foot has four toes,** *and the toes have* **thick, strong, blunt claws,** *like the claws on the dog's foot. The rabbit's foot is* **a paw.** *Tell that rabbits live in holes in the ground. They use their paws and their strong, blunt claws* **for digging.**

II. Hoofs

1. **The Horse's Foot.**—*Show a picture of the horse. Call special attention to the feet. Lead the class to tell that these feet are not at all like paws. Instead of having a number of toes with strong claws at the end of them,* **this foot is all in one piece.**

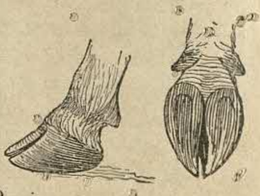


Point out the hard, strong case which covers the foot all over.

"We call a foot like this **a hoof.**

"Can you think of any animal besides the horse that has hoofs?" "The **donkey's feet** are like the feet of the horse. They are **hoofs** too."

2. **The Cow's Foot.**—*Show next a picture of the cow. Compare the feet with those already shown. Lead the children to tell, in the first place, that they are not paws. Make them tell why.*



Call attention to the two parts of the foot on which the animal walks.

Tell that these are **two toes.** *Show that each toe is enclosed in a* **hard, strong shell or case.** *The cow's foot is* **a hoof;** *but it is not all in one piece like the hoof of the horse. It looks as if it were* **split in two.** *Such a hoof is called* **a cloven hoof.** *Cloven means* **split in two.**

Elicit from the children, if possible, or tell them where they fail, that **sheep, goats,** *and* **pigs** *have cloven hoofs like this.*

Lesson XXIX

FEEDING OUR PETS

I. INTRODUCTION

INTRODUCE the lesson by reminding the children that all living things—plants as well as animals—must have food or they will die. We have learned that to feed our plants and keep them alive we have only to water the soil in which they grow, and they will get all they want for themselves.

Most boys and girls like to keep some pet animal; but it is very cruel to forget to feed them properly. Pussy runs about the house, and can get her own living, but some pets, such as rabbits and white mice, are kept shut up in a hutch or a cage. They cannot get any food unless we give it to them.

"Let us think about some of our pets now, and the food they like best. Suppose we begin with Pussy.

"What do you think she would like best for her dinner?"

"She would like a piece of meat best."

"Yes, she would, and so would the dog. Well, suppose I got a piece of meat from the butcher's shop to feed all our pets with. The cat and the dog would eat up their pieces quickly enough, and perhaps look for some more. But if we gave the next piece to the rabbit, what would he do with it?

"He would turn away from it; **he would not eat the meat.**

"Suppose, instead of the meat, I gave him a nice, fresh

carrot. Would he eat that?" "Yes; **he would eat it all up,** and enjoy it."

"Would the cat and the dog like one too, if we had one to spare?" "No; the cat and the dog would **turn away from the carrot.** They would not eat it."

"But if we did not want our piece of meat to be wasted, we might take it out and give it to a horse in the street, or to a sheep or a cow in the field. Would they like it?" "No; **they would not touch the meat.**"

"What do you think the horse would like best?" "Some **hay,** or a handful of **oats** or **beans** would suit him best."

"Quite right; and the sheep and cows like nothing so well as the **green grass** that grows in the fields. Let us try and find out what all this means. To find out, we must look at the teeth of these animals."

II. THE TEETH OF ANIMALS

Tell that animals, like ourselves, have teeth in both jaws; but the teeth of one animal are not like those of another. If we want to find out what food any animal eats, we must see what kind of teeth it has.

1. **The Cat and the Dog.**—"The teeth of both these animals are alike. They are **pointed,** and **very sharp.** You know you have some large broad teeth at the back, with square flat tops, for chewing up your food. The cat and the dog have large square teeth at the back of their mouths too, but **the tops of them are full of sharp points.**

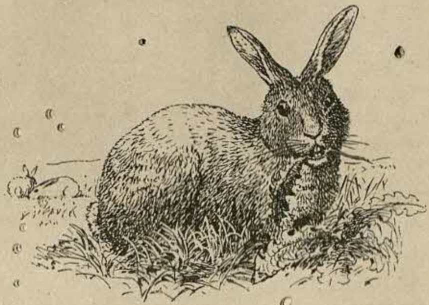
"You remember, too, of course, that your lower jaw moves when you are eating. You can move your jaw not only up and down but from side to side as well. This is to help you to chew your food.

The cat and the dog can move their jaw **only up and down**, and not from side to side.

“Their teeth are not made for chewing or grinding, and their jaws are not made for chewing. They are meant **for cutting through flesh.** This is why they like a piece of meat better than anything else.”

2. **The Rabbit.**—“Let us give the rabbit a piece of carrot now, and watch while he eats it.”

Call attention to the way in which he **nibbles** *the carrot, biting off little pieces with his front teeth. Notice, too, that when he chews his food* **the jaw moves from side to side,** *as well as up and down.*



Point out the long, flat, sharp teeth in front of his mouth. **They are like little chisels.** *They slice off pieces of the carrot, and these are chewed up by the broad flat-topped teeth behind.*

“The rabbit **gnaws his food.** He could not eat the same food as cats and dogs. **Rats** and **mice** have the same **chisel teeth** in front. They **gnaw** their food.”

Remind the children of the holes that rats and mice sometimes make in our cupboards, and in the bread, cheese, and other things. They do this with their sharp, gnawing teeth.

3. **Cows, Sheep, and Horses.**—*Tell that these animals have* **very large chewing teeth,** *and that* **the jaw moves sideways** *as well as up and down, to grind and chew the food*

on which they live—**grass, hay, oats, beans.** *They could not live on the food that cats and dogs eat.*

Lesson XXX

EYES AND EARS OF ANIMALS

I. THE EYES

1. **Introduction.** — *Commence by leading the children to tell what they can of their own eyes, in some such way as this :—*

"We have learned to call the eyes **the windows of the body.** Why?" "Because **the light shines in through them,** as it does through the windows of our houses."

"What use is that to us?" "When the light shines into the eye, **we are able to see things** around us."

"What do we call the little window of the eye through which the light shines?" "We call it **the pupil of the eye.**"

"What do we call the coloured part of the eye all round the pupil?" "**The iris.**"

"What is the iris?" "It is **a little curtain** that can be pulled aside or drawn closer round the pupil."

"What does that do?" "It makes the pupil **larger or smaller.**"

"When does the pupil want to be larger?" "**When the light is dull.**"

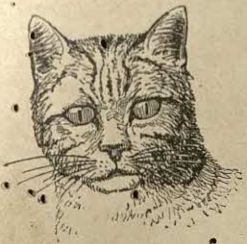
"Why?" "To let **more light** into the eye."

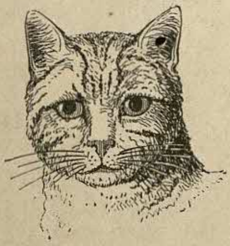
"When does it want to be made smaller?" "**When the light is very bright.**"

"Why?" "**To shut out some of the light.**"

2. **The Cat's Eyes.** — *Call attention to pussy's eyes. Show that the pupil is not round, like the pupil of our eyes. It is a* **long, narrow, upright slit,** *but as evening comes on*

this slit will get wider and wider. At night the pupil will be





wide open, like **a great round window,** *ready to take in all the light there is.*

Lead the children next to think about the mice. They are very timid little creatures. When do they come out of their holes? At night when all is quiet. This, then, is pussy's best time for catching them. Her eyes are made to see when it is so dark, that very few other animals can see.

3. **The Mouse's Eyes.**—*Think now of the poor, timid, little mice. They have to come out to get their food, but they are so terribly afraid of that great fierce cat, that is prowling about ready to spring upon them. They have nothing to save them from her but their quick little legs. They run like a dart to their holes, if they can only see her coming. These little animals, then, ought to have very sharp eyes.*

"Where do the mice live in the day-time?" "In their **dark holes** under the floor."

"When do they come out to get their food?" "At night **when the house is dark**."

"They live all their lives in dark places. If we look at their eyes we shall see that they are like little **round, black beads**. The eye is **all pupil**; there is no white part round it. They want **a wide-open window** to take in all the light they can get."

4. **The Rabbit's Eyes.**—*Refer next to the rabbits in the fields. Remind the children that they live in holes in the ground, which they dig out with their paws; but they have to come out into the fields to get their food.*

"Rabbits are timid little creatures. When they are feeding in the fields, they dart away like the wind at the least sign of danger. Their eyes are **wide-open windows.** They are placed **at the sides of the head,** and not in front, so that they may see well all round them.

If a mole could be got, it would be well to introduce this little animal now. He lives under the ground, too; but he lives all his life in the dark, and does not come out into the open fields to get his food. Ask the children to look for his eyes. When they fail to find them, as they will, tell that **he has no need for eyes.** *It is too dark to see in those dark holes under the ground where he lives. He has two small eyes, but they are covered up under that thick fur, so that we cannot find them.*

II. The Ears

Deal with the ears in a similar way. Refer the children to the lesson on their ears. The ear is meant to tell us something which we cannot learn through the eye. Lead them to tell that the ear itself **is made of gristle,** *and why.*

Describe the large, erect, wide-open ears of timid, defenceless animals like the rabbit. They catch the least sound, and tell when any danger is near.

Show and describe the cat's ears. They, too, are very sharp. Why?

Lesson XXXI

THE COVERING OF ANIMALS

I. INTRODUCTION

The children's own bodies will again form an appropriate starting-point for the new lesson. Begin by calling upon them to place the hand on some part of their body, and tell how it feels. It feels warm.

"Why does our body always feel warm?" "We have warm blood in every part of the body. It is **the warm blood inside** the body that keeps it warm."

"Is our body warm in the very cold weather?" "Yes; **it is always warm.**"

"How do we keep it warm in the winter?" "We put on **thick, warm clothes.**"

"Do we always wear these thick, warm clothes?" "No; when the warmer weather comes, we take off our thick clothes and put on thin ones."

"Now think of the animals that we see around us. Have any of them warm blood and warm bodies like ours?" "Yes; all the animals that **walk and run about on four legs** have warm blood and warm bodies, and so have **birds.**"

"Do you know any animals whose bodies are always cold?" "**Fishes, frogs, worms, slugs, and snails** have cold bodies."

"Fred has brought me a frog to show you. Let them look at it, Fred. I want you all to think about the frog and then about our little kitten here.

"The frog's body, you say, is cold; kitty's body is warm. We can easily feel this if we touch them with our hands.

"Now I want you to look at the two animals. Do your eyes tell you why one looks warmer than the other?" "Yes; the kitten has a **thick, warm coat** to keep its body warm. The frog has **no coat at all.** Its body is **naked.**"

"Quite right. You must now remember that not only the kitten, but all animals with warm blood, inside their bodies, have thick, warm coats to keep them warm."

II. FUR, HAIR, AND WOOL

Proceed next to examine the kitten's coat. Let the children stroke it, and tell that it is very thick, soft, and smooth. Show that it is made of fine soft hairs, which grow very thickly on the skin.

Rub the coat the wrong way, and let the children see that it does not lie nice and smooth now, it looks rough and untidy. The hairs of this beautiful thick coat are all made to lie one way. It is this which makes the coat look so smooth and glossy.

Have the rabbit produced now, if possible, so that the children may see and compare its coat with the coat of the kitten. If the live animal cannot be procured, a rabbit skin must be substituted. Lead them to tell that the two coats are exactly alike. They are thick, soft, warm coats made of very fine, short, straight hairs, which lie all one way. A coat of this kind is called fur. Notice that the hairs get very fine indeed near the ends.

"Where does the rabbit live?" "It lives in holes in the ground."

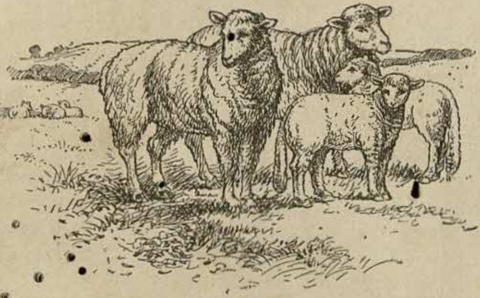
"Yes; think of it. Night as well as day, winter as well as summer, the rabbit must lie in the cold, damp ground. Do you see why he has such a thick, soft, warm coat of fur?

"Some animals, we shall find, live in places, where the ground is covered with ice and snow most of the year. All these animals have warm fur coats, but much thicker and warmer than the rabbit's fur."

Refer the children next to the horse, the donkey, the cow, and the dog. Let them tell that these all have hairy coats; but it is not the same smooth, soft hair as the fur of the rabbit is made of; the hair of these animals is rougher and coarser. How rough and coarse the donkey's coat is. The coats of the donkey, cow, *and horse, are made of short, straight hairs; but some dogs have long, curly coats.*

Show a good picture of sheep and lambs in the fields.

“Now I want you to think of the sheep. Where do they live all the year round?” “They live in the open fields.”



“Picture to yourselves the sheep lying, all together, under a tree with the snow all round them. They want a warm coat.”

Show a piece of sheep's wool. Tell what it is, and where it came from. Let the children examine it for themselves and describe it. It is hair, like the coats of other animals, but it is very close and curly hair. It grows very thick on the sheep's back. It is just the coat to keep him warm in the cold weather, and during the cold wet nights.

Lesson XXXII

WINTER AND SUMMER COATS OF ANIMALS

I. INTRODUCTION

As before, excite the interest of the children by leading them to talk about themselves. They know that their own bodies are warm, as well as the bodies of the animals we talked about in the last lesson.

Lead them to tell that, when the body is warm, it is made warm by the warm blood within it. All such bodies must have a covering of some sort to keep them warm.

Let them tell also that one great difference between us and those animals is, that they all have a warm covering of some kind for their body, we have no covering of any kind.

"Now I want you to think carefully for a moment.

"What would happen to the sheep, rabbits, and other animals, in the cold weather, if they had no thick, warm wool or fur to cover them?" "They would die. **The cold would kill them.**"

"But we have no thick fur or wool to cover our body.

"Can you tell me why?" "**We can make clothes for ourselves.** Those animals could not do that. They have not sense enough to do it."

"What do we do with our winter coat when the cold weather is all gone?" "We put it away, and **wear a thinner one.**"

II. HOW ANIMALS CHANGE THEIR COATS

If it be summer weather, a very practical illustration of the lesson may be given, by letting one of the girls take the rabbit or the kitten in her lap.

Call attention to the loose hairs clinging all over her frock. Where did these hairs come from? They came from the animal's fur coat.

"Let us see what this means. The weather now is warm. Where is your thick, winter cloak, Mary?" "It is at home."

"Why did you leave it at home?" "I do not want it now; it is too warm."

"When will you want it again?" "When the cold weather comes back."

"Now let us think of the kitten and the rabbit. They do not want a thick, warm coat to-day any more than we do.

"Your thick cloak, on a hot day like this, would make you feel ill; and these animals would feel ill too if they kept their winter coats on all through the summer. **They change them before the hot weather comes.**

"Let us see how they do it. As soon as the cold ice and snow are gone, some of the hairs of their thick coats **begin to get loose and fall off.**

"The warmer the weather gets, the more hairs fall out, and by the time the very hot weather comes, **their coats have got quite thin.**

"But all this time little new hairs are growing up, and when the cold winter comes again, the animals have a **thick, new over-coat** to keep them warm.

"These animals, you see, are luckier than some boys and girls. They are sure of a new, warm over-coat every winter."

III. THE SHEEP'S WOOL

"Now suppose we think about the sheep's coat. That grows very thick before the cold weather comes. It keeps the sheep warm all through the winter; but like the rabbit's fur it would begin to fall off as soon as the winter was gone."

Show a picture of sheep-shearing. Tell what the men are *doing with the sheep. Call attention to the big shears in the hands of the men, and the shorn wool lying on the ground.*

Tell that it is spring weather; the snow and ice are all gone. The sheep do not want their thick, woolly coats. It would make them ill to wear such thick coats now.

If the men left the sheep alone, some of the wool would fall off, just as the hairs fall out of the rabbit's fur. But we want the wool from the sheep's back. Therefore we do not wait for it to fall off. The men cut it off with their shears. It is best for the sheep; it keeps them well and healthy. It gives us something that is very useful to us.

"Do you know, Mary, that your **thick, winter cloak was made from some wool, which had been cut off the back of a sheep?** The sheep did not want its thick, woolly coat any longer, and it was cut off to make you a thick, warm cloak for the winter."

OBJECTS AND OTHER ILLUSTRATIONS REQUIRED

STAGE I

LESSON I

THE teacher will require a piece of string; a long, thin, flat ruler; and a piece of wire. The black-board and chalk must always be ready. The children should be provided with slates, pencils, and rulers.

LESSON II

The same as for Lesson I.

LESSON III

The teacher will require the ruler, two sheets of drawing-paper—one square, the other oblong; and some drawing-pins. The children should be provided with the kindergarten sticks and peas, and with slates, pencils, and rulers.

LESSON IV

The teacher will require the ruler, a piece of string, a few sheets of paper; and the children their slates, pencils, and rulers, and the kindergarten rings.

LESSON V

Provide a large round biscuit, a penny, a piece of wire, a wooden ball, a very round turnip, and a knife.

LESSON VI

The teacher should be provided with the wooden ball of Lesson V., black and white chalk, a sheet of drawing-paper, some drawing-pins, and a sufficient number of balls of black and white worsted, for distribution round the class. Of course the teacher would take care to have as many black and white objects on the table, as she could get together.

LESSON VII

Provide a few of the black and white balls of Lesson VI.; a sheet of drawing-paper; some drawing-pins; black, white, red, and yellow chalks, a bright red apple and an orange, a knife, and a sufficient number of the red and yellow kindergarten balls and coloured paper-strips, for distribution among the children.

LESSON VIII

The red, yellow, blue, and green kindergarten balls and coloured paper-strips will be required for the children, and the teacher must be provided with coloured chalks and drawing-paper as before.

LESSON IX

Provide the wooden ball, a large marble, and a ball of worsted, a piece of bread, two potatoes—one raw, the other boiled, and a knife.

LESSON X

Two pieces of board—one rough, the other smoothly planed, some strips of writing-paper and coarse brown paper.

LESSON XI

Cubes of cork, wood, stone, and lead; a tumbler of water; some wood and cork sawdust, some sand and small shot; a piece of soft wood and a saw.

LESSON XII

Three tumblers—one filled with clear water, another with sweetened water, and the third with water which has been acidulated with tartaric acid or the juice of a lemon; two or three small saucers; some vinegar; a lemon; some unripe fruit.

LESSON XIII

Pieces of salt and loaf-sugar of equal size and shape; three saucers; a nutmeg-grater; some tartaric acid and sulphate of quinine; wormwood, gentian-root, rue, and one or two gall-nuts.

LESSON XIV

A good sturdy scarlet geranium in a flower-pot, and a few other flowering plants (bearing blue, white, and yellow flowers if possible).

LESSON XV

The geranium of last lesson, or a good strong fuchsia; a good picture of a tree; a piece of the woody stem of a tree; a few clusters of blossoms, if possible, from the trees named in the lesson.

LESSON XVI

Some roots of tall grass, and the plants which were used in the last lesson; a knife.

LESSON XVII

Some bunches of buttercups and daisies; and a growing plant of each; a sheet of drawing-paper.

LESSON XVIII

An empty chalk-box; an unbroken one filled with chalks; and the parts of a third box which has been taken to pieces for the occasion; a pencil-box; a knife; a screw-driver or a chisel; and a piece of one of the harder woods.

LESSON XIX

A few apples—one at least a bright red: a knife; a picture of an apple-tree; an unripe apple (a crab if possible).

LESSON XX

The schoolroom table; a piece of string.

LESSON XXI

A common Windsor chair; a stool.

LESSON XXII

A doll's house; slates, pencils, and rulers for the children.

LESSON XXIII

The doll's house (interior).

LESSON XXV

The shank bone from a leg of mutton, that has been well cleaned, and is fit to handle.

LESSON XXVIII

A lead pencil; a hammer; a yard or two of rope.

LESSON XXIX

A live kitten; a white mouse, or some other tame pet brought by one of the children for the occasion; a stone; a plant in a flower-pot; a bird in a cage; and a fish in a bowl of water.

LESSON XXX

The kitten and the mouse of last lesson; a tame rabbit; some sheep's wool.

LESSON XXXI

The kitten, rabbit, and bird of the previous lessons; a bird's nest with eggs in it; a hen's egg.

LESSON XXXII

An earthworm, a slug, and a snail; a picture of a snake, or a prepared specimen if possible.

LESSON XXXIII

A fish in a glass bowl of water; a fresh herring (or some other similar fish).

STAGE II

LESSON I

Provide a long, flat ruler; some drawing-paper and drawing-pins; a new lead pencil.

LESSON II

The flat ruler, drawing-paper, and pins as in last lesson.

Lesson III

The kindergarten cubes and bricks.

Lesson IV

Provide a few small saucers; some pans or cakes of the three primary colours, a few brushes, and a basin of water, a sheet of drawing-paper and some drawing-pins, a small spoon, the kindergarten balls, and a ripe orange.

N.B.—In the instructions in the body of the lesson, the teacher is advised to use paints in preference to coloured chalks. In the first place, it is difficult and expensive to obtain good standard colours in chalk; and the chalks, moreover, are too soft and brittle for the children to use. Then, too, it is very easy to mix small quantities of the liquid paints in a saucer to make the secondary colours; and this gives a very effective illustration of the teaching.

The moist colours in pans are the best, but good cake paints will serve the purpose quite as well.

Carmine, Naples yellow No. 1, and ultramarine would be the three most suitable colours for our present purpose.

Of course, if suitable chalks could be obtained, and the teacher preferred them to the paints, she would not require the brushes and saucers. In the simpler lessons of Stage I., where the teacher does it all, and there is no mixing, chalks are recommended in preference to paints.

Lesson V

All the articles used in the last lesson will be again required here. Provide also the diagram, showing the relation of the three secondary colours to the three primary colours from which they are formed, as described in the lesson.

Lesson VI

The three primary colours, the saucers, and brushes, the sheet of drawing-paper, and the drawing-pins, as used in Lesson

IV., will again be required ; and, in addition, pans (or cakes) of Chinese white and ivory black should be provided.

The kindergarten balls, skeins, or reels of coloured silk, cotton, and worsted, and coloured paper-strips will be required for recapitulation.

LESSON VII

A new brick ; strips of red, yellow, and blue paper ; a few lengths of paper of varying width ; a piece of deal board ; a thin strip of wood ; a piece of cardboard ; a sheet of drawing-paper ; and a piece of ordinary writing-paper.

LESSON VIII

The brick and paper-strips from last lesson ; a foot-rule ; some plain strips of card-board, exactly the size and shape of the foot-rule ; a few lengths of paper cut to different sizes, but always measuring an exact number of feet (old newspapers pasted together will do as well as anything) ; and some pieces of string, wire, and tape.

LESSON IX

A sheet of paper exactly a yard long, and a yard-stick, as described in the lesson ; a foot-rule ; the strips of card-board used in the last lesson, and some others with the inches marked on them.

LESSON X

A few common annuals from the garden ; a hyacinth growing in a glass of water ; a carrot and a turnip ; a picture of the growing carrot.

LESSON XI

Note the instructions in the lesson itself.

LESSON XII

Some buttercups and daisies ; and a collection of simple garden flowers.

LESSON XIII

A ripe apple and a supply of other fruits, according to the particular season of the year; some peas, beans, nuts, poppy-heads, etc.

LESSON XIV

A large, round, glass basin.

LESSON XVI

The spirit lamp and a small kettle; a tumbler of water.

LESSON XVIII

Two common building bricks—one red, the other yellow; a cube of wood; the kindergarten bricks.

LESSON XIX

A lump of moist clay; a knife; a piece of wood; a dried brick-shaped lump of clay; a picture of a brickfield.

LESSON XX

A basin of water and a small dusting brush; a small tray.

LESSON XXI

A pair of small hand-tongs; pieces of coal, stone, brick, clay, chalk, wood, and coke; some ashes and cinders from the fire; a cinder-sifter.

LESSON XXII

A poker and a pair of tongs; some cinders, coal, wood, shavings, and paper; the spirit-lamp and the pair of small hand-tongs; a hammer.

LESSON XXIII

A cup and saucer, a plate, and a tumbler; a jug of water; a piece of bread; a broken plate; a flower-pot.

LESSON XXIV

A bullock's eye fresh from the butcher's shop; a hollow indiarubber ball.

LESSON XXV

A large univalve shell of some sort; a piece of gristle from the butcher's shop; a bone of some kind; a child's toy drum; a bell.

LESSON XXVI

Two or three small saucers; some water; some paraffin oil.

LESSON XXVII

A bullock's tooth; an apple; a slice of bread.

LESSON XXVIII

A live cat, dog, and rabbit should be obtained if possible for this lesson.

Show pictures of the paws of each; and also pictures of the horse and cow, and their hoofs.

LESSON XXIX

Pictures showing the teeth of the cat, rabbit, horse, and cow.

LESSON XXX

Pictures showing the eyes and ears of the cat, mouse, and rabbit.

LESSON XXXI

A live frog; a kitten; a rabbit; a picture of sheep and lambs in the fields; some sheep's wool.

LESSON XXXII

A live rabbit or a kitten; a picture of sheep-shearing.

THE END

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